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Personality Changes Associated with Organ Transplants

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Abstract: Personality changes have been reported to occur following organ transplantation, and most commonly among heart transplant recipients. We set out to examine whether personality changes do occur following transplantation, and specifically, what types of changes occur among heart transplant recipients compared to other organ recipients. A cross-sectional study was conducted in 2022, in which 47 participants (23 heart recipients and 24 other organ recipients) completed an online survey. In this study, 89% of all transplant recipients reported experiencing personality changes after receiving their organ transplant, which was similar for heart and other organ recipients. With the exception of physical attributes, the types of personality changes reported were similar between the two groups. These finding indicate that heart transplant recipients are not unique in their reported experience of personality changes following organ transplantation. Further studies are needed to deepen our understanding of what causes these personality changes following organ transplantation.

Keywords: Personality change; organ transplant; heart transplant; temperament; emotions; preferences

1. Introduction

More than 144,000 organs were transplanted worldwide in 2021 [1] and between 40,000 and 45,000 hearts are transplanted annually throughout the world [2]. Interestingly, some transplant recipients have reported developing personality traits that were not present prior to their transplant, and a few have claimed that these traits were present in their donor. Such reports have appeared in both the lay literature [3] and the medical literature [4-5]. Personality profiles in patients following organ transplant have been suggested to influence the outcomes of organ transplantation and the psychological stability of the patient [6].

Potential mechanisms responsible for personality changes following heart transplantation have been previously described[7]. Currently, it is not known if personality changes occur following the transplantation of organs other than the heart. We set out to investigate whether individuals who underwent any organ transplantation reported changes in their personality following their transplant, and whether these changes occur more frequently in recipients of heart transplant than in recipients of other organ transplants.

2. Materials & Methods

We conducted a cross-sectional survey of people who live in the United States and had previously undergone organ transplantation at any time in their life. We collected demographic information and asked whether participants had experienced any changes in their personality since receiving their new organ, and if so, what these changes were.

Participant Recruitment

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Participants were recruited by communicating with transplant centers and transplant support groups either via telephone, email, or on Facebook during 2022. Since many of the phone numbers were medical offices that could not directly disclose patient information or numbers that were no longer in service, the majority of participants were recruited by advertising on Facebook to public organ transplant support groups or by requesting to join private groups. A Facebook page was specifically designed for this project. We identified and communicated with approximately 20 Facebook support groups. Recruitment ended in December 2022. Participants were asked to complete an anonymous survey that was administered online and took approximately 15 minutes to complete. A total of 67 participants had initiated the survey, with 47 completing the entire survey. For this analysis, our sample included 23 heart transplant recipients and 24 other organ transplant recipients. Study data were collected and managed using REDCap electronic data capture tools hosted at the University of Colorado [8]. IRB approval was obtained from the University of Colorado, Anschutz Medical Campus for this study (IRB# app001-2).

Survey

The survey consisted of 61 questions total, which included two sections. The first section consisted of questions to assess demographic such as gender, age, and race. In addition, general questions were included to gather information about participants' organ transplantation. The second section asked specific questions to assess self-reported types of personality changes that participants might have experienced either prior to, during or after transplantation. Data was requested on 16 different types of personality changes, which included changes in temperament and emotions, as well as preferences for food, music, sports, colors, religion, etc. Participants were also asked to provide free-text report of any other personality changes that were not specifically requested in the survey.

Analytical Methods

Data are reported for all participants collectively, as well as by type of organ transplant (heart vs other). There were 3 participants who reported having more than one organ transplant, which included 1 participant who received a heart and a lung transplant and 2 participants who received a kidney and other (unspecified) organ transplant. These individuals were included in the analysis, with the heart/lung recipient being included in the heart group and the kidney/other recipients being included in the other group. Demographic characteristics and personality characteristics are presented as percentages. Statistical comparisons were made between heart versus other recipients using Chi-square or Fisher's Exact tests with a 0.05 level of significance.

3. Results

A total of 67 participants had initiated the survey, with 47 completing the entire survey. For this analysis, our sample included 23 heart transplant recipients and 24 other organ transplant recipients. The demographic characteristics of participants are listed in Table 1. Nearly half the participants were heart transplant recipients. Other organs transplanted include kidney, lung, and liver. Among all transplant recipients, the mean age was 61.9 years old, with over 80% being Caucasian and 60% being retired. The demographic data were similar when comparing heart transplants to other organ transplants. There was a non-significantly larger percentage of males who received a heart transplant (60.9%) compared toother organ transplants (42.7%) (P=0.14). Approximately 38.3% of all transplant recipients had heard of personality changes occurring due to transplant, yet less than 8.5% were concerned with experiencing personality changes.

Table 1. Demographics.

Characteristics	All transplants (n=47)	Heart (n=23)	Other* (n=24)
Age – mean (SD)	61.9	63.2	60.3
Male**	24 (51.1%)	14 (60.9%)	10 (41.7%)
Female	22 (46.8%)	8 (34.8%)	14 (58.3%)
Caucasian**	38 (80.9%)	18 (78.3%)	20 (83.3%)

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Other (Black, Hispanic, Asian)	8 (17.0%)	4 (17.4%)	4 (16.7%)
Retired	28 (59.6)	15 (65.2%)	13 (54.2%)
Married**	30 (63.8%)	16 (69.6%)	14 (58.3%)
College grad or post-grad	22 (46.8%)	11 (47.8%)	11 (45.8%)
Changes due to transplant			
Heard of personality changes?	18 (38.3%)	8 (34.8%)	10 (41.7%)
Feared personality changes?	4 (8.5%)	3 (13.0%)	1 (4.2%)

*Other includes 6 lung, 10 kidney (2 had indicated having another transplant), 8 liver. **1 declined from heart group.

Personality changes reported following transplantation are listed in Table 2. Among heart transplant recipients, a change in physical attributes was the most common change reported, with 95.7% reporting a change in comparison to 54.2% among other organ transplants (P=0.03). When excluding changes in physical attributes, 89.3% of all transplant recipients reported experiencing a personality change after receiving their organ transplant. Other changes that were more prevalent among heart transplant recipients, but not statistically significant, included participation or watching of sports activities (30.4% versus 8.9%), temperament (60.9% versus 50%), and food preferences (47.8% versus 33.3%). A change in memories was more commonly reported among other organ transplants compared to heart (20.8% versus 8.7%). The most common reported change among other organ transplants was in emotions, although this was similar among heart transplants (58.3% versus 52.2%). Negligible differences in percentages were observed with other personality attributes when comparing heart and other organ transplants, and/or relatively few individuals reported experiencing these personality changes.

Table 2. Personality changes .

Reported Personality Changes	Heart (n=23) (%)	Other (n=24) (%)	All (n=47) (%)
Physical Attributes*	19 (95.7)	13 (54.2)	32 (68.1)
Temperament	14 (60.9)	12 (50.0)	26 (55.3)
Emotions (happy, sad, etc.)	12 (52.2)	14 (58.3)	26 (55.3)
Food	11 (47.8)	8 (33.3)	19 (40.4)
Participating or Watching Sports	7 (30.4)	2 (8.3)	9 (19.1)
Physical Activities	6 (26.1)	7 (29.2)	13 (27.7)
Personal Identity	4 (17.4)	4 (16.7)	8 (17.0)
Movies/TV	3 (13.0)	1 (4.2)	4 (8.5)
Religious/spiritual Beliefs	3 (13.0)	3 (12.5)	6 (12.8)
Sexual Preferences	3 (13.0)	1 (4.2)	4 (8.5)
Memories	2 (8.7)	5 (20.8)	7 (14.9)
Music	2 (8.7)	3 (12.5)	5 (10.6)
Art	0 (0)	1 (4.2)	1 (2.1)
Colors	0 (0)	0 (0)	0 (0)
Electronic Devices	0 (0)	2 (8.3)	2 (4.2)
Political views	0 (0)	1 (4.2)	1 (2.1)
ANY (excluding Physical Attributes)	21 (91.3)	21 (87.5)	42 (89.3)

*denotes a P<0.05 when comparing heart to other.

Table 3 summarizes the total number of personality changes presented in Table 2 that participants experienced after transplantation, excluding a change in physical attributes. Among all transplant recipients, 36.2% reported having 4 or more personality changes. When stratified by type of transplant, heart transplants were more likely to report having 4 or more personality changes compared to other organ transplants (47.8% versus 25.0%), although this was not statistically significant.

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Table 3. Summary of number of changes per group.

	All Transplants (n=47)	Heart (n=23)	Other (n=24)
Any changes (excludes PA)	42 (89.4)	21 (91.3)	21 (87.5)
No. of changes			
0	5 (10.6)	2 (8.7)	3 (12.5)
1	9 (19.1)	5 (21.7)	4 (16.7)
2	9 (19.1)	3 (13.0)	6 (25.0)
3	7 (14.9)	2 (8.7)	5 (20.8)
4 or more	17 (36.2)	11 (47.8)	6 (25.0)

4. Conclusions

The majority of participants (89.3%) who underwent organ transplant reported changes in their personality following transplantation. The percent of participants reporting any personality changes was comparable between heart transplant recipients (91.3%) and other organ transplant recipients (87.5%). These results suggest personality changes following any organ transplant are common. However, this study was not designed to confirm these personality changes with collateral contacts or evaluate the impact of such changes on the individuals who experienced the changes. Similarly, survey methodology for this study predisposes to volunteer selection bias, likely resulting in a disproportionately higher number of reported personality changes in transplant recipients.

In looking at the types of personality changes reported by organ transplant recipients, the only statistically significant difference between heart and other organ recipients was a change in physical attributes. Although there were some other differences observed between these groups when looking at specific types of personality changes, the number of participants in each group was too small to achieve statistical significance. Overall, the similarities between the two groups suggest heart transplant recipients may not be unique in their experience of personality changes following transplantation, but instead such changes may occur following the transplantation of any organ.

Our study was not designed to determine the cause of personality changes following organ transplantation. Such changes could be hypothesized to result from physiological changes resulting from the acquisition of a new organ, the psychological sequelae of undergoing a major surgical procedure, or the transfer of personality traits through donated organs. Further studies are needed to determine the etiological factors contributing to the personality changes reported and to determine if such changes are more common with specific types of organs.

Author contributions: B.C.: study conceptualization and design; acquisition and interpretation of the data; writing – review and editing. L.K.: study conceptualization and design; data acquisition; writing – review and editing. M.S.: study conceptualization and design; data acquisition; writing – review and editing. L.H: study conceptualization and design; acquisition, analysis, and interpretation of data; writing – review and editing. B.W.: study conceptualization and design; writing – review and editing. M.L.: study conceptualization and design; writing – original draft; writing – review and editing. All authors have read and agreed to the published version of the manuscript.

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Short Biography of Authors

Brian Carter Brian Carter is a fourth-year medical student at the University of Colorado School of Medicine, originally from Phoenix, AZ. After completing his undergraduate degree at the University of Portland, he obtained a Master's Degree in biomedical engineering and a Certificate Degree in technology entrepreneurship. After a short career experience in the surgical simulation and surgical device industries Brian began medical school with the goal of soon becoming a practicing academic General Surgeon.

Laveen Khoshnaw Laveen Khoshnaw is a fourth-year medical student at the University of Colorado School of Medicine applying to internal medicine residencies with the goal of subspecializing in nephrology. She is passionate about total body wellness, primary care, and preventative medicine. As a Kurdish-American woman, she has firsthand experience of intersecting identities and how these various dimensions create the whole individual, inspiring her to be a part of this manuscript that focuses on personality changes post-transplant, ultimately seeing how this impacts total individual wellness.

Megan Simmons Megan Simmons is a recent graduate of the University of Colorado, Colorado Springs where she received a Bachelor of Science degree in Biology. Megan hopes to broaden her knowledge by pursuing a research career in biology and related fields.

Lisa Hines Lisa M. Hines, ScD, is a Professor in the Department of Biology and a Co-Director for the UCCSTeach Program at the University of Colorado at Colorado Springs (UCCS). She received her doctorate in epidemiology at the Harvard School of Public Health and completed a post-doctorate in proteomics at the Harvard Medical School. She was extremely grateful to receive a Fulbright Scholar Award in 2017 to teach and do research with the Education Department at Kasetsart University in Bangkok, Thailand. Her main research interests include disparities in breast cancer incidence and mortality and improving STEM education.

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Brandon Wolfe Brandon Wolfe is a fourth-year medical student at the University of Colorado School of Medicine. He has yet to move from Colorado since the age of 13 when he first moved here. He went on to complete his undergraduate degree at Colorado College. He is passionate about multi-disciplinary care and understanding how each field of medicine can contribute to understanding the whole picture of a person's health and well-being. Outside of the hospital, Brandon takes every opportunity he can to enjoy the beautiful state of Colorado with his wife and dog.

Mitchell Liester Mitch is an Assistant Clinical Professor in the Department of Psychiatry at the University of Colorado School of Medicine. Mitch attended Arizona State University where he obtained a Bachelor of Science degree in Biology, then received his MD degree from the University of Colorado School of Medicine. Following a psychiatric residency at the University of California, Irvine, Mitch returned to Colorado when he has lived and worked for the last 34 years.