

Accessible Beekeeping:

Improving Quality of Life with Therapy and Assistive Technology

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Exploratory Data on U.S. Beekeepers with Disabilities



- First Exploratory Survey of Beekeeping and Disabilities
 - Dr. Brian Wentz (Shippensburg University, PA)
 - Paper published in Including Disability Peer Review Journal.
 - Scan QR code or Visit www.accessiblebeekeeping.org to read!

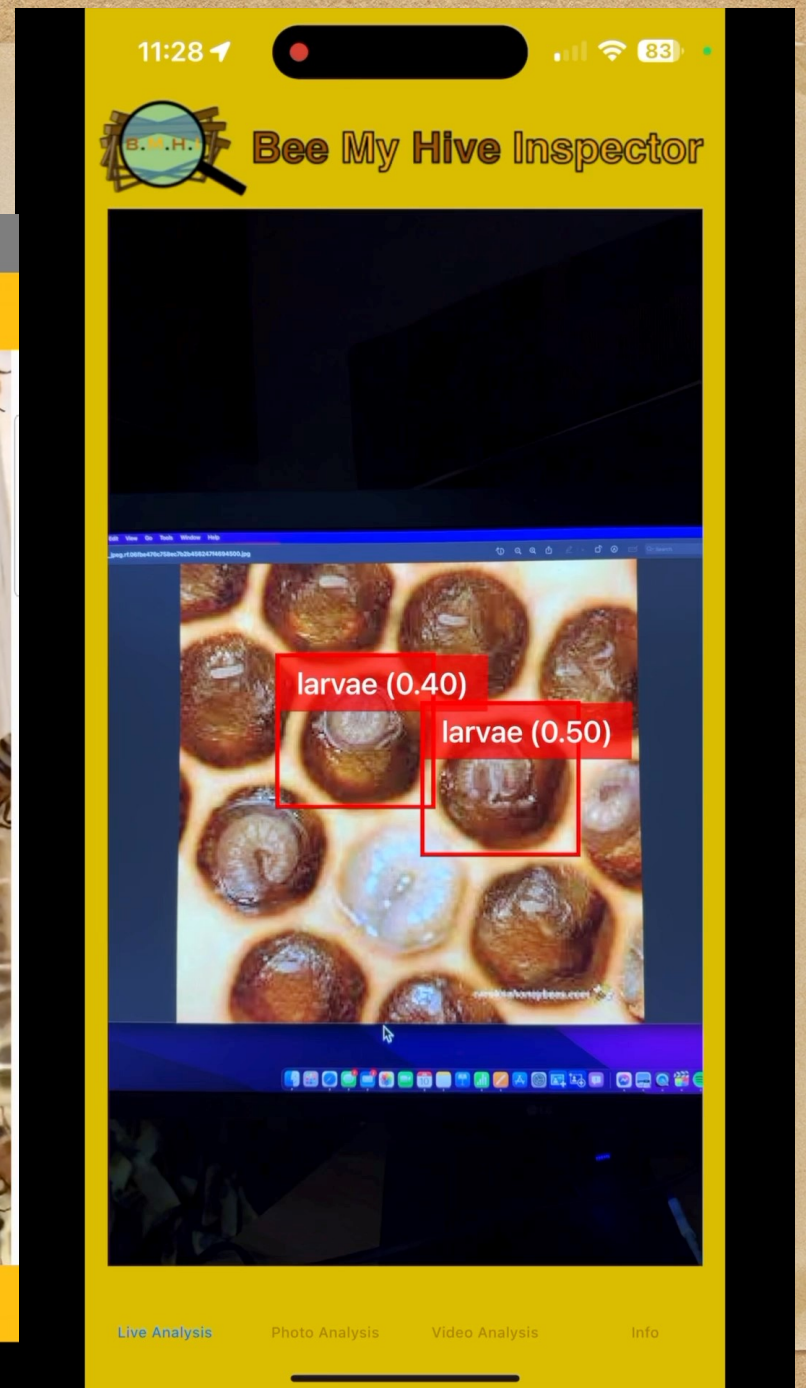
Read
Me!!!



BEE MY HIVE INSPECTOR

- Designed by Accessible Beekeeping to aid hive inspections of visually impaired or disabled beekeepers
- IOS Beta under Testing
- Android Beta under Testing

Become a tester:
Submit Photos:



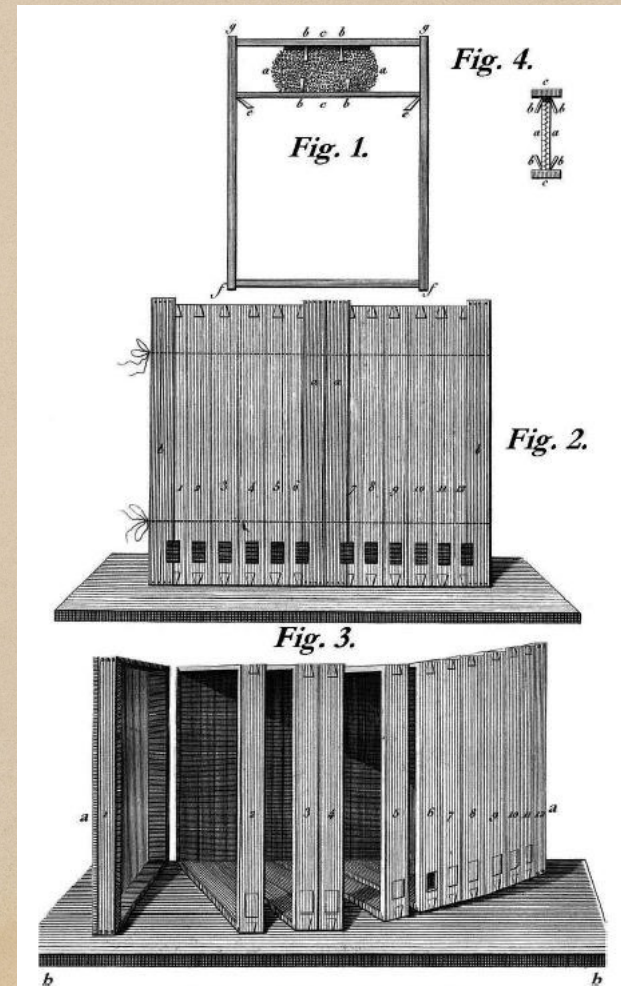
Accessible Beekeeping History

History

- François Huber 1792
- Beekeeping as a vocation for disabled veterans of World War I
1919
- Slovenian Beekeeper's Association

François Huber

- 1750 - 1831
- Blind
- Swiss entomologist specializing in Honey Bees
- Discoveries
 - Queen does not mate in the hive
 - Confirmed bees able to convert eggs into queens using royal jelly
 - Communication using antennas
 - Folio Hive - Designed ancestor to our modern day observation hive



1919 Beekeeping Vocational Manual

- World War I left lots of veterans lost and confused upon returning to the U.S.
- PTSD
 - Formerly known as shell shock
- Manual for beekeeping
 - What is honey and it's uses?
 - How was wax used during the war?
 - Coat equipment to prevent rust and make things water proof
- Freedom from sugar rations
 - Sugar was rationed during WWI and honey was used as a supplement sweetener.
- Vocational training from beekeepers



Slovenia Beekeeper's Association

- Slovenia is one of the leading EU countries in number of beekeepers per capita.
- Slovenian AZ hive
- Beekeeping manual for disabled people - Dec 2018
- Beekeeping as a Therapy for Individuals with Mental Disability



Let's Talk about
Accessible Hive
Solutions

Hive Types

- Langstroth
- Slovenian AZ
- Horizontal Hive
- Top Bar
- Layens
- Parkinson Hive

Langstroth

- Reverend Lorenzo Langstroth - 1851
- Pros
 - Handles bee space
 - Interchangeable and readily available equipment
 - High honey production
- Cons
 - Weight
 - Honey super weighs up to 70 lbs
 - Invasive inspections
 - Large storage requirements for unused equipment



Slovenian AZ Hive

- Pros
 - Less stress on bees
 - Lifting roughly 6 lb frames multiple times
 - Possible higher honey yields
 - Designed to inspect each level individually
- Cons
 - Bee house
 - Traditional AZ frames not compatible with langstroth
- AZ Hives North America, LLC
 - Virginia
 - Crafted in Slovenia
 - Fits traditional langstroth frames



Horizontal Hives

- Pros
 - No Heavy lifting
 - Easier hive inspections
 - Less equipment
- Cons
 - Limited space
 - Frequent inspections
 - Less resources compared to langstroth
- Horizontal Bees
 - North Carolina
 - Designed a tilting hive located in our experimental apiary
 - Hard crafted and designed in house



Top Bar Hive

- Pros
 - Low start up costs
 - Easy on back and body
 - Fairly non-invasive inspections
 - Closer to nature's way
 - Bees build smaller comb which can help with pests control
- Cons
 - Difficult to find mentor
 - Specific techniques for handling bar
 - Less honey production
 - Non standardized parts



Russian bees
hard at work
barn hive
May 19th
2019

Layens Hives

- Pros
 - Effective insulation means less honey consumption
 - Cheaper than langstroth
 - Easy to inspect and minimal lifting and bending required
 - Less invasive then moving whole boxes
- Cons
 - Fewer mentors
 - Difficult to move
 - Doesn't fit traditional extractors
 - Crush and strain
 - No additional space like langstroth
- Bearsville Bees
 - West Virginia
 - Hand crafted and designed per customer



. Pros

- . No need to lift or touch individual frames
- . Use of frame holders
- . Can use langstroth, top bar, or flow frames
- . Adaptable frame holders
- . Moveable bottom entrance
- . One frame holder built to be entrance
- . Open on bottom
- . Winterization
- . Adaptive to foam inserts
- . Slanted design
- . Natural for bees
- . Direction guidance
- . Venting
- . Easily add Nuc and build off it

Parkinson Hive

. Cons

- . Local mentor limited
- . Social media a must
- . Must be built by beekeeper
- . Fixed size



- Apiaries are often in remote areas away from medical support
- Consider
 - Soil Types
 - Flat, compact surfaces
 - Wood, concrete, rubber, weed exclusion cloths, i.e.
 - Tripping Hazards
 - Hive stands
 - Different Hive solutions
- Clearance between hives
 - For example 5 feet in all cardinal directions
- First Aid Kit
 - Epi-pens, bandaids, anti-septics, cooling cloths, ie

Accessible Apiary

- Parking must be in close proximity
- Pathways must be wheelchair accessible
 - Grass or dirt manageable by powered chair
 - Pavers for manual

How is beekeeping
Made Accessible
Currently?

Blind



- Uses sounds, smell, and feel to inspect hive
- Can't use gloves because it takes away a heightened sense
- Takes pictures with iPhone and sends to mentor to find brood status

Deaf

- Losing any sense can remove valuable information
- Studies have been done on the acoustics of the hive.
- Acoustic monitoring devices are being developed internationally to help interpret the acoustics of your hive

Physical limitations

- Wheelchair
 - Maneuvering around hive
 - Accessing hive
 - Terrain
- Damage or lack of strength in back or extremities
 - Weight
 - Endurance
 - Gripping
- Balance
 - No one wants to take out a colony of bees!
- Overcoming limitations
 - Transfer boxes
 - Different hive types
 - Rest breaks
 - Manageable apiary

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Assistive Technology

Assistive technology (AT) is any item, piece or product system that is used to maintain or improve the functional capabilities of persons with disabilities.



Whole Hive Moving



Hand-held dollies such as this one from MannLakeLtd.com lift from the sides of the hive bodies. Item #MH-105.



Fork Hand Truck

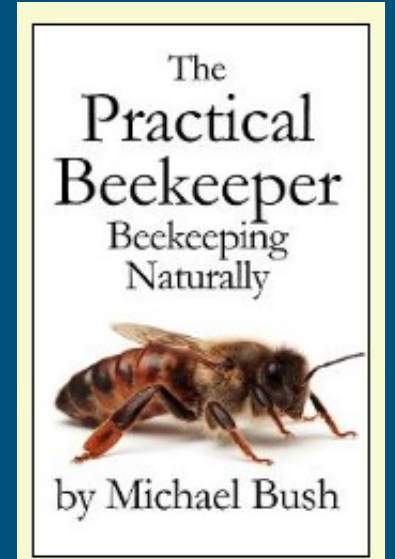
Item# HTK-2351



This hand truck from HandTrucksRus.com would move whole hives.

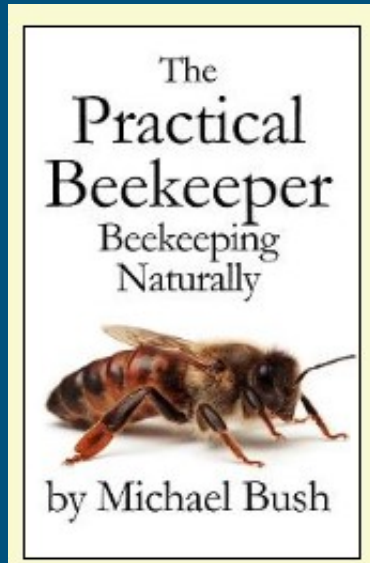
Whole Hive Moving

<https://bushfarms.com/beescarts.htm>



Whole Hive Moving

<https://bushfarms.com/beescarts.htm>



Whole Hive Moving

<https://www.beesource.com/threads/beehive-moving-device.340279/>



Individual Hive Body Lifts: 2-Person Carrier



The two-person hive carrier is a low-cost accommodation that divides the weight in half. It is item #935C at BrushyMountainBeeFarm.com.

Lift individual hive bodies or an entire hive with two people.

<https://www.mannlakeltd.com/>

Individual Hive Body Lifts: Cranes



High Tech or Low Tech Cranes
for different size operations.
\$300 up to \$30,000



<https://www.northerntool.com>

Individual Hive Body Lifts: Cranes



Individual Hive Body Lifts Crane Tongs



<https://www.instructables.com/Hive-Lifter-Tongs/>



Individual Hive Body Lifts Crane Tongs



<https://www.healygroup.com.au/hive-lift/>

Individual Hive Body Lifts

<https://www.countryfields.ca/products/kaptar-lift-electric>

<https://www.beebreedingcentre.com/product-page/hives-lifter-model-2>

<https://beehivelifters.com/> Made in the USA

<https://www.poldingroup.com/en/produkt/beehive-lifter-1-4-m/>



Individual Hive Body Lifts: DIY

<https://www.youtube.com/playlist?list=PLVvPW9G-aYgPxttbmLemQwm8W4jC1LLP>





Conclusion

Assistive technology in the apiary will increase the likelihood of success for a beekeeper with medical impairments. Beekeeping is a very satisfying enterprise, and can be done by workers with medical impairments. Modified tools and equipment enable tasks that would otherwise be impossible or unhealthy for the worker.



Thank you!



www.AgrAbility.org

Beekeeping at the Manchester VA

2018 The HIVES- Therapeutic Beekeeping Program started at the Manchester, NH VA Medical Center.



Benefits of the Program

“Since I have been in the club from the beginning not only has my mood been a lot better, I have also cut back on my meds by over half (was up to around 30 three times a day). Program keeps me grounded which I have to pay attending to the bees, and not what I am feeling or thinking about.”

“ I am much better grounded, and within the mindset of now. I have noticed that when I do start having some of my issues I convert my thoughts to the bees, and what I need to due on my next weekly inspection. “

“I have been more active, since I have been getting my medical issues fixed quicker for my asking it to be done through my doctors so I can take care of the bees better, and I also now have two hives myself because of the program.”



Mindfulness and Self-Care at the Hives

- Guided 5 senses meditation
- Yoga for beekeepers
- Deep breathing
- Meditation with the hive
- Routine

Adaptations

- PTSD
- Anxiety
- Depression
- Heat Sensitivity
- Physical Disability



Providing resources

- Veteran's Crisis Line 988
- Department of Veteran Affairs www.va.gov
- State Office of Veteran Care
- Veteran Service Organizations- VFW, American Legion, DAV, etc.



Quality Improvement Project 2021

The purpose of the project was to evaluate the effectiveness of a beekeeping as a recreational therapy intervention and to propose recommendations for any changes in the group based on the information reported.

The data will be used to determine if the Veterans are getting benefits from the beekeeping program, in person and virtually. This information will be used to guide the facilitation of the group and future research to explore the benefits of beekeeping as a therapeutic intervention.



Quality Improvement Project 2022

Project Goals

- **Primary Goal:** *To establish a final educational model for a Beekeeping Educational Program that is part of a replicable beekeeping therapy model for VA hospitals and clinics.*
- **Secondary Goal:** *To confirm which veterans will benefit most from participation in the Beekeeping Educational Prog*

This quality improvement effort utilized standardized quality of life surveys (EQ-5D-5L) to determine if the results in the first quality improvement project can be reproduced.



QI Project 2021

5 question survey was offered to each participant before and after each session.

Voluntary

Anonymous

Aware that it is for QI Project

QI Project 2022

Utilized EQ-5D-5L which looks a current health status. Also looking at influence of education and standardizing education.

Voluntary

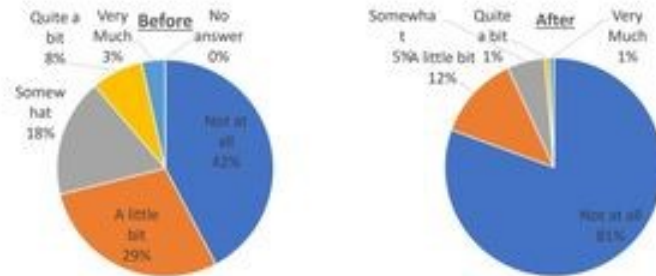
Paired for Pre and Post

Aware that it is for QI Project

QI Project 2021 Findings

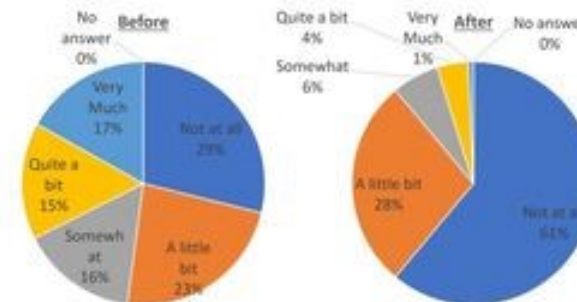
Significant changes were found in anxiety, loneliness, pain, stress, sadness, and current state.

Results: I feel sad



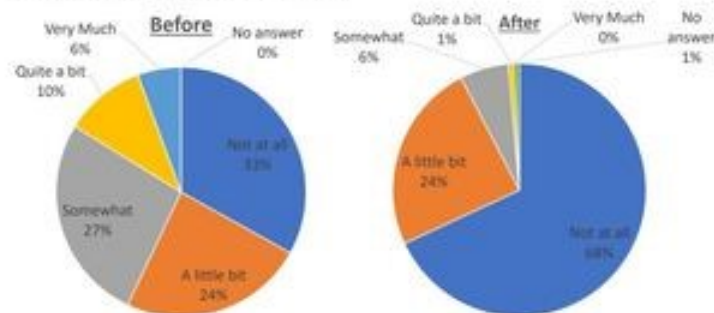
There was a significant decrease in sadness from before the session ($M = 1.01$, $SD = 1.11$) compared to after the session ($M = 0.28$, $SD = 0.667$), $t(283) = 6.7$, $p < .001$.

I feel stressed



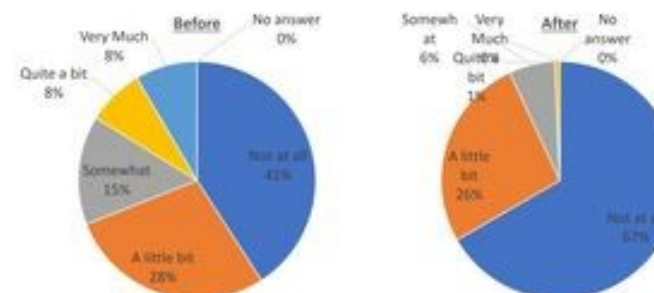
There was a significant decrease in stress from before the session ($M = 1.68$, $SD = 1.46$) compared to after the session ($M = 0.55$, $SD = 0.84$), $t(284) = 8.01$, $p < .001$.

Results: I feel anxious



There was a significant decrease in anxiety from before the session ($M = 1.31$, $SD = 1.19$) compared to after the session ($M = 0.42$, $SD = 0.741$), $t(284) = 7.5$, $p < .001$.

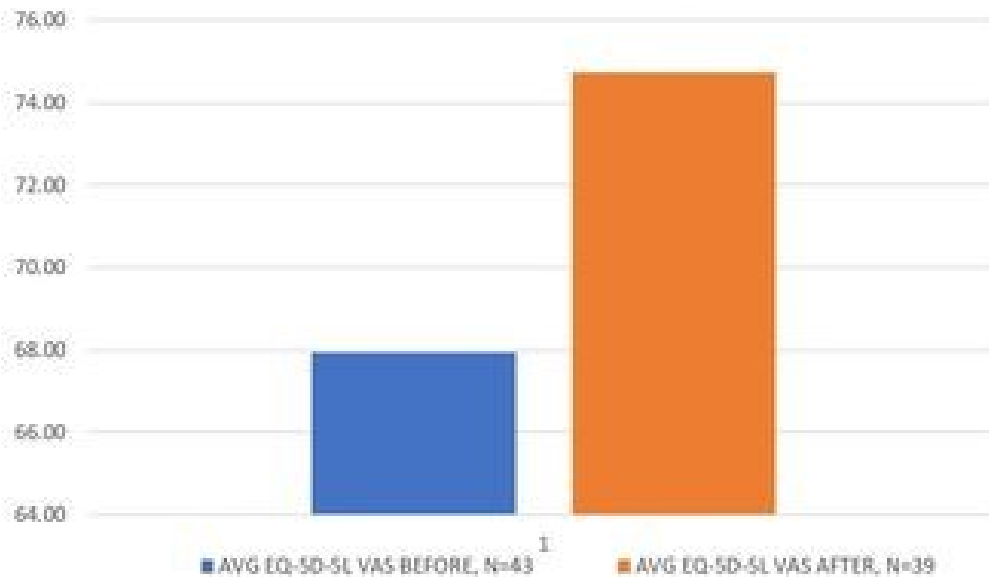
I feel lonely



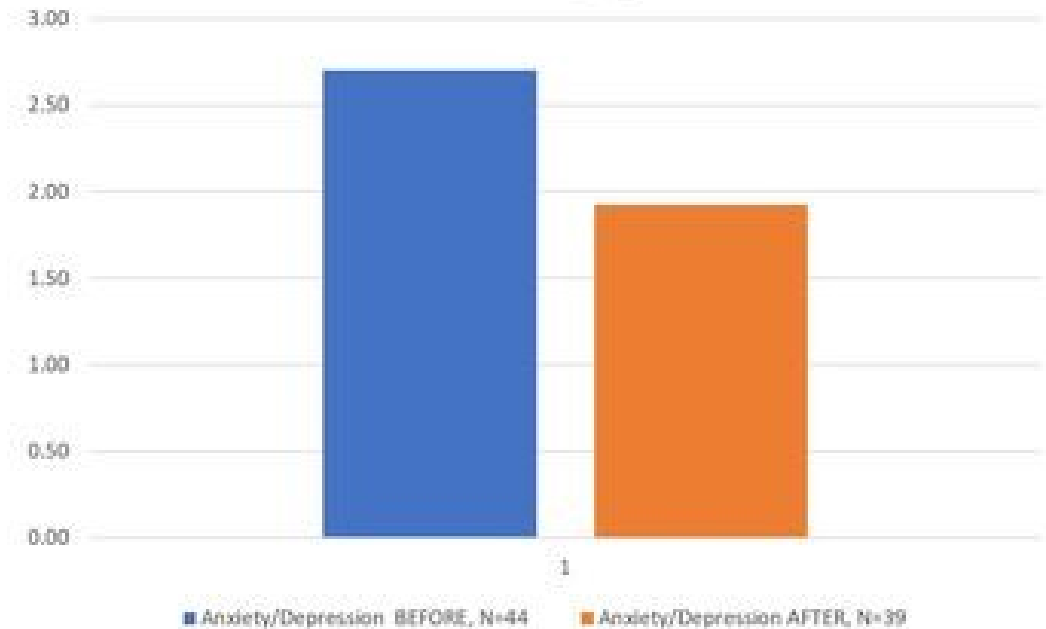
There was a significant decrease in loneliness from before the session ($M = 1.15$, $SD = 1.27$) compared to after the session ($M = 0.41$, $SD = 0.64$), $t(284) = 6.2$, $p < .001$.

QI Project 2022 Findings

AVG EQ-5D-5L VAS(Overall Health) Scores Before and After Beekeeping Sessions



AVG EQ-5D-5L Anxiety/Depression Domain Scores Before and After Beekeeping Sessions



2022 Pre- and Post- beekeeping session surveys using the EQ-5D-5L showed significant changes in Anxiety/Depression ($F(1, 81) = 11.631, p = .001$) and perceived health status/VAS ($F(1, 81) = 5.279, p = .024$).

QI Project 2022 Findings

Veterans showed a significant change in mobility from before to after session.

- There 7.5% negative change in mobility scores from before to after the sessions
- Adaptive equipment might impact these changes in positive way.

Education prior to participation also seemed to influence the effect of the experience.

- There was a much larger improvement in overall health status those that completed the online Heroes to Hives (H2H) program after sessions than not completed.
- Those that completed the H2H have a better baseline score of anxiety/depression than those that did not, but those that did not had an almost double the amount of improvement after sessions versus those that did complete.

QI Project 2022

The data from 2022 supports the findings from 2021

There appears to be significant changes in mental health status from the beginning to end of Therapeutic Beekeeping sessions.

Education prior to hive side participation appears to have an influence on the overall experience.

Limitations of this project include a small data set, and not widely used assessment tool (in the US).



Therapeutic Beekeeping- Where next?

- Offer Bee School 3 times per year to educate Veteran before and during participation in the hive-side programs.
- Research project to look at mental health and health outcomes is in the developmental stages.
- Collaboration with Heroes to Hives to develop standardized training for facilitators of Veteran therapeutic beekeeping programs in mindfulness and well-being practices (funded with USDA SARE Grant).
- Working with VA Innovation Network to spread to other facilities.

Thank You

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<https://marketplace.va.gov/innovations/hives>

HIVES

Honeybee Initiative for Veterans' Empowerment and Support

