

Collecting Normative Population Data in a Museum Setting

ABSTRACT

As part of a larger protocol on how balance changes with age, the study investigates the feasibility of community research in a museum setting.

Introduction

In the environment of space, changes in gravity can affect muscles, bones and balance. As part of the standard tests, vestibular testing is conducted on astronauts pre and post flight. These observations not only characterize the physiological effects of space flight, but provide valuable information for the understanding and treatment of balance disorders on Earth.

The prevalence of vestibular disorders in adults is not very well known and prevalence in children is utterly unknown. Previous research has sought to establish normative data for adults on standard clinical screening tests. To date, no research has been done to establish norms for children. This experiment, in collaboration with Space Center Houston (SCH) is an extension of a multi-phase epidemiological study that is being done by Baylor College of Medicine (BCM) to establish normative data for adults and children to improve the efficacy of clinical screening tests. The novel objective of this study is to explore the value of conducting research in a museum setting.

Data collection with the larger sample size available at SCH may further demonstrate age related changes in adults and supply data needed to develop norms for children. Also, data from the diverse sample available at SCH may help determine if any racial/ethnic differences exist.

Methods

Testing at SCH is conducted in an area of the museum with high visibility and foot traffic. Interested visitors approaching the study area are briefed on the overall objective, relation to space exploration. The tests include the Clinical Test of Sensory Integration and Balance (CTSIB) and tandem walking balance tests (Figs. 1,2). The approximate time per subject is under 10 minutes.

Prior to participation, adults gave informed consent and children gave assent after their parents/guardians provided informed consent.

Figure 1

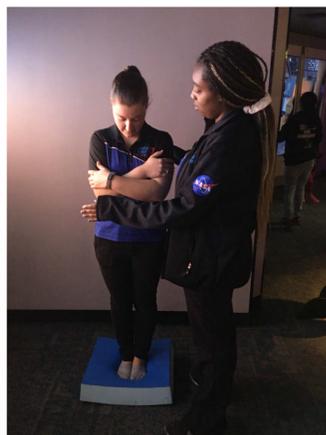
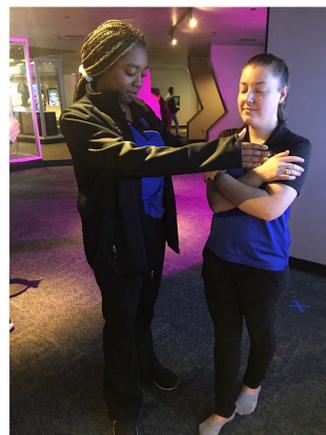


Figure 2



Following the tests, the subjects are asked if their participation in the study increased their understanding or appreciation of the conduct scientific research and if given the opportunity, would they again participate in such a trial. The subjects are thanked for their participation with Center stickers.

Results

Testing at Space Center Houston began in June of 2019 and as of January 2020, 630 subjects have been enrolled. Of these, 374 (56%) are adults and 256 (53%) children. The racial and ethnic demographics of subjects tested are reasonably representative of the greater population (See Table 1).

Results from the subject questions show that the majority of participants feel as though they have an increased understanding/appreciation for research (95.3%). The results also show that the majority of subjects would be interested in participating in research in the future (96.7%) (See Table 2).

Table 1

	BCM	SCH	HOUSTON	TEXAS	USA
White	57.3%	68.6%	75.6%	78.8%	76.5%
Black	25.2%	4.7%	22.5%	12.8%	13.4%
Asian	17.5%	9.8%	6.9%	5.2%	5.9%
Hispanic/Latino	13.9%	22.8%	44.8%	39.6%	18.3%
Non-Hispanic/Latino	86.1%	71.5%	54.4%	60.6%	81.2%

Table 2

	YES	NO
Having Participated in Research did the Subject Increase Understanding / Appreciation for Research?	95.3%	4.7%
Having Participated in Research would the Subject be Interested in Participating in Research in the Future?	96.7%	3.3%

Conclusion

Conducting a study in a museum setting was found to be feasible and provides investigators with a large diverse population. Center guests experienced an authentic research experience, increasing their appreciation and understanding of the scientific process. Contribution to the conduct of research enhanced the guests' visit and their understanding of vestibular issues in space and the benefits of such research to issues on earth.