History of Starvation and Refeeding

The Minnesota Experiment

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Framing research in the light of history is very enlightening and adds depth to the findings. This column will look at Ancel Keys', PhD seminal work, which took 36 volunteer subjects and subjected them to a rigorous regimen, which included feeding, caloric restriction to starvation levels and then refeeding.[1]

Dr Keys' research at the University of Minnesota began in 1944, one year before the end of World War II. American soldiers were entering German towns and encountering civilians in various states of wasting due to very limited diets in both variety and calories. This generated questions about the best way to treat them, and there was little scientific study with humans upon which to rely. Back in the United States, Keys' who also served as a consultant to the United States War Department decided to examine human starvation. His study examined the physiological and psychological effects of starvation so that European civilians and American soldiers could be better fed. [2,4]

Keys' study was financed by the Office of the Surgeon General and various groups of Mennonites, Quakers, Brethren, and Unitarians.[3] It is interesting that the funding for this study was actually a partnership in both manpower (volunteers for the study) and funding between church and state. The volunteers for the study were conscientious objectors who instead of being conscripted into the military were allowed to serve their duty time in the Civilian Public Service (CPS). Over 400 men serving in the CPS responded to Keys' brochure describing the study.[2] Out of this number, 36 men were selected and 34 men finished the year long study consisting of three months of feeding, six months of starvation and three months of refeeding.[4]

The research notes of Keys' and his fellow researchers were published as the *Biology of Human Starvation* in 1950, five years after the end of their research. The notes recorded protocols of calorie and protein levels, individual manipulation of calories based on the amount of weight loss, and the accompanying requirement of 22 miles per week of exercise. Participants were well informed of the study's goals. They required a 25% loss of body weight during the six month starvation period. While the feeding protocols make for fascinating reading by anyone interested in the history of nutritional science, even more enlightening from a psychosocial viewpoint is the personal reactions of the participants. It appears that the 36 male participants approached their duty as research "guinea pigs" enthusiastically and were eager to do something meaningful for their country while upholding their religious beliefs. The study showed that starvation dramatically alters personality and that nutrition affects both mind as well as body.[3]

In 2003-2004, Kalms and Semba[3] from Johns Hopkins School of Medicine completed an oral history with 18 of the Minnesota Experiment survivors. These men were now in their 80s and were universal in stating their belief in the sanctity of life which drove them to declare themselves as conscientious objectors. The men were also united in relating how significant their participation was in war time. They stated that the starvation study made them feel that they were true patriots and making a significant contribution to the country without taking a life.

These oral histories also addressed the participant's fixation on food as the calories were reduced. These reports detail the participant's dread of seeing the posting of the rations for the next week. Interviews with the men discuss the weakness and irritability that accompanied the weight loss and the temptations of smells from the bakery or even from the decomposing food in the garbage bins.

Interestingly none of the participants reported being fully rehabilitated after the three month refeeding period. Although they regained much of their weight within the refeeding period, their strength, sex drive and even humor were slow to return - indicating the profound and long term effect of starvation.

When Keys' research is examined in today's political and cultural climate against torture, it is striking that over 400 men would volunteer for starvation to the point of protruding ribs, edema-swollen ankles, and legs, lose 25% of their body weight in six months and be confined to a college campus, sleeping in a windowless dormitory room. The men used communal showers and latrines without any personal privacy. Understanding the role of the military draft in the lives of these young men and their strong pacifist beliefs allows one to appreciate the participation of these men in

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Report from RDPG Clinical and Translation Science Sub-Unit (CTSS)

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The National Center for Research Resources will announce the next round of Clinical and Translational Science Awards (CTSA) this spring. As of early next year all General Clinical Research Centers (GCRCs) will be at the end of their funding cycle and will be competing for the CTSA if they have not already received this grant. It is truly the end of an era for the staff and the investigators who produced outstanding research at these centers. While several GCRCs are awaiting the results of their CTSA application, several sites are working on completing renewals. Those institutions that received the CTSA on the first round of funding in 2006 are now showing the results of five years of CTSA research. This change represents a challenge to Bionutritionists across the country who are working to determine the best ways to support investigators under the CTSA system. For more information about which institutions have received the new grant please visit http://www.ncrr.nih.gov/clinical_research_resources/clinical_and_translational_science_awards/interactive_awards_map/awards/. By following the link for individual institutions you can learn more about the research being conducted at each site.

This past fall was a busy time for the RDPG CTSS. The sub-unit developed an online survey for RDPG members, which was sent out to the electronic mail list (EML) in October 2010. The purpose of this survey was to determine the level of awareness of the CTSA within the RDPG community. We had a great response with over 100 members completing the survey. The answers indicated that while over 60% of respondents are aware of the CTSA, less than 50% know whether their institution is a recipient of the grant. This result, along with the fact that only 33% of respondents have utilized a CTSA site or GCRC, brings about a clear goal of linking nutrition researchers with the resources at CTSA sites. I am happy to be that link between RDPG members and CTSA sites. If you would like to know if there is a CTSA at your institution or in your area please do not hesitate to contact me and I will connect you with the Bionutritionist closest to you.

In collaboration with the National Association of Bionutritionists (NAB) the RDPG CTSS hosted a meeting at Food & Nutrition Conference & Expo (FNCE) in Boston. Members of the NAB, who support the nutrition research at CTSA's, have a wealth of knowledge and can offer any researcher support and expertise on a wide range of services. Bionutritionists from the Harvard Catalyst and University of Florida spoke at the sub-unit meeting at FNCE and described the extensive list of services available. Mara Vitolins, DrPH, MPH, RD, a RDPG member and researcher, shared her experience at the GCRC at Wake Forest University. She is grateful for the expertise the GCRC has provided and she has accomplished much with the staff's support. We hope this meeting was just the start of a strong collaboration between NAB and the RDPG. While the two groups do have similarities with their focus on nutrition research, they can also learn from each other and work together with outstanding results.

The goal of both these endeavors was to facilitate collaboration between RDPG members and the NAB. The result of this relationship will be more comprehensive nutrition research.

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a starvation study which in its own way was as important as world peace.

References

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