Association of early greying in young adults of Bulawayo with risk of hypothyroidism

Lee-Anne Chazanga, Mercy Mathe, Tinashe Simanga, Simbarashe Mandisodza, Ethan Mtinhima, Lionel. M. Phiri, Chara Mabeza, Nicole Magunje, Michelle Chada and Tatenda. F. Mujati

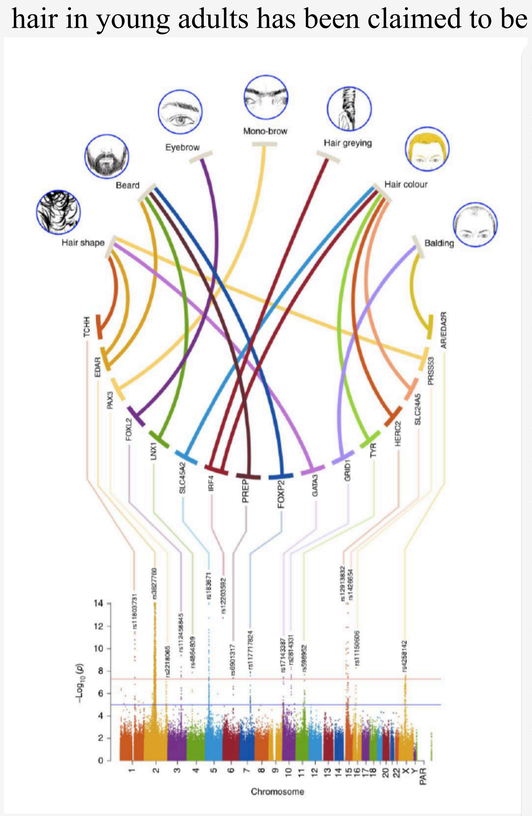
Founders High School, Bulawayo

INTRODUCTION

The premature growth of grey hair in young adults has been claimed to be related to autoimmune thyroid disease, hypothyroidism).The body's immune system causes the thyroid gland to lower the amount of hormones produced. Hypothyroidism can be hereditary, meaning it runs in families (https://my.clevelandclinic.org/health/diseases/12120-Hypothyroidism).

RESEARCH PROBLEM

The premature development of white hair is mostly genetic, is an important cause of low self-esteem, often interfering with socio-cultural adjustment. Hair colour is determined by what kind of melanin pigment is deposited in each hair shaft as it grows, but this hair-colouring process breaks down with age which is why development of white hair is associated with aging. The premature growth of white hair in young adults has been claimed to be related to autoimmune thyroid disease, hypothyroidism.



The gene identified for grey hair, IRF4, is known to play a role in hair colour. This gene is involved in regulating production and storage of melanin, the pigment that determines hair, skin and eye colour. The **T** allele of **rs12203592** is reported to be associated with hair colour risk for greying in America where the CC is at 86 %, the TT at 4% and the TC at 10%. It has also been shown that Caucasians grey earlier than African Americans. There is limited data for African populations, moresore for Zimbabwean.. It is therefore important to understand the social and health implications of this early greying in our population. In particular, it will be important to evaluate the predictive value of early greying for risk of developing hypothyroidism. The study will also generate genetic variant frequency data for the Zimbabwean population.

Figure 1. Signals picked from GWAS study on genes important for various hair properties.

HYPOTHESIS:

NULL HYPOTHESISH : Early greying is not a biomarker for risk of hypothyroidism.

ALTERNATIVE HYPOTHESIS : Early greying is a biomarker for risk of hypothyroidism.

OBJECTIVES

1. Identify 100 young adults with grey hair and 100 controls without greying. Given the exploratory nature of the study, in each group, 50 women and 50 men will be identified.
2. Administer a questioner on social and health issues associated with early greying.
3. Collect blood for examination, for analysis of thyroid hormones for known markers for the **rs12203592** IRF4 gene variant associated with greying of hair

MATERIALS AND METHODS

Inclusion and exclusion criteria

- To answer the research question and test our hypothesis, we will conduct a set of experiments which include defining the sampling sites in Bulawayo. Previous studies have shown that whilst greying starts in the 30s for Caucasians, it starts in the 40s for people of African origin.
- For increased sensitivity, for our study, individual with greying at ages under 30 will be considered as early greyer. For the control, we will take samples from people who are over 40 and are still not greyed.

RESULTS

Total number of blood samples:

- 73 participants were recruited. From the age of 18-30 years, 49 are females and 22 are males and two, one female and one male were older than 40 years.
- This preliminary report describes data from only 20 participants who clompleted the full study questionnaire.
- Figure 2. Highlights some of the history of greying for the 20 participants.
- Almost all the participants acknowledge the role of genotics in early greying.
- 50% indicated that early greying does reduce their self-esteem.
- From the respondents 17 consumed sadza, beef and vegetables, 3 consumed sadza, rice, beans, lacto, potatoes. Most individuals consumed sadza, beef and vegetables.

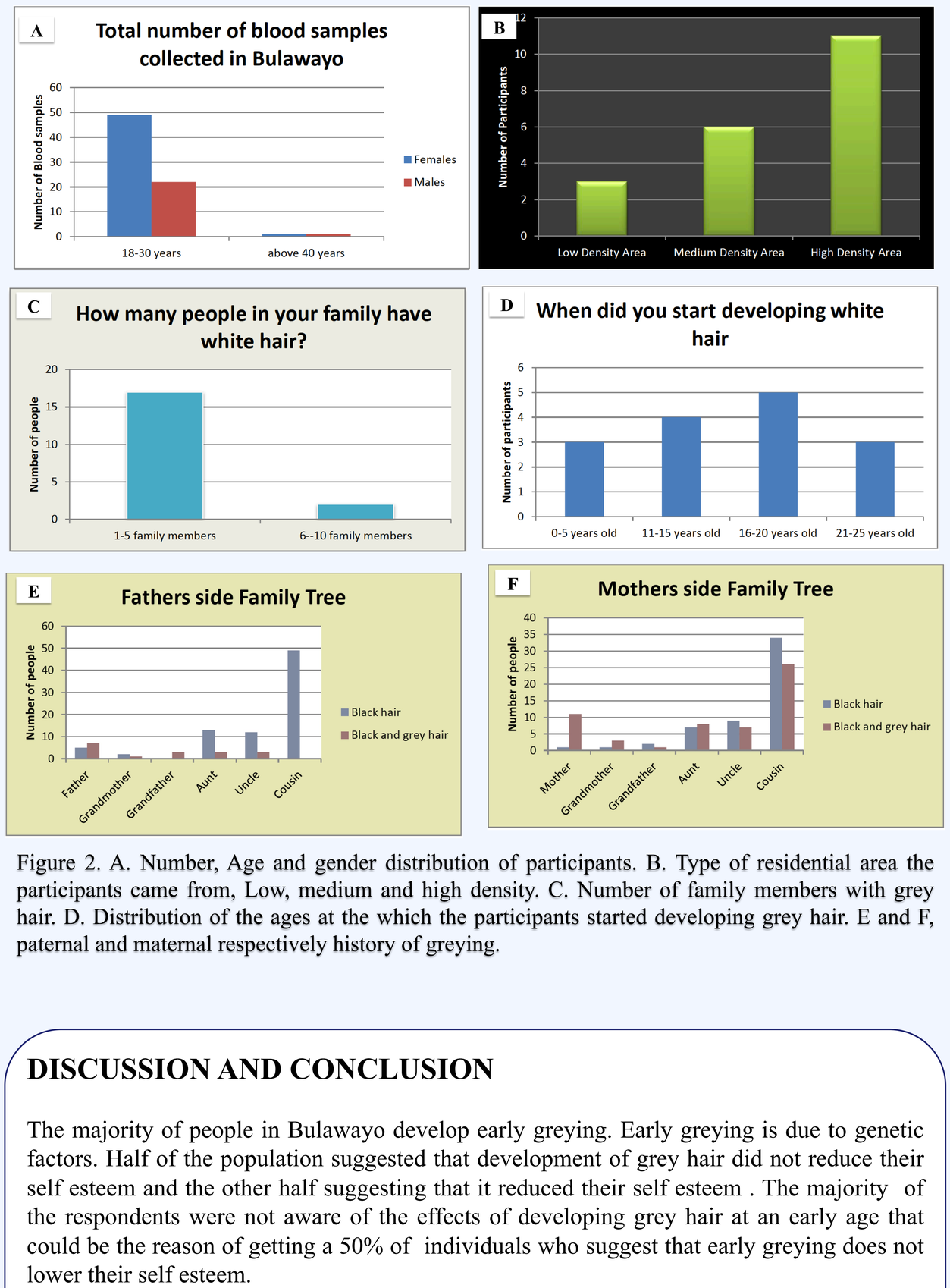


Figure 2. A. Number, Age and gender distribution of participants. B. Type of residential area the participants came from, Low, medium and high density. C. Number of family members with grey hair. D. Distribution of the ages at the which the participants started developing grey hair. E and F, paternal and maternal respectively history of greying.

DISCUSSION AND CONCLUSION

The majority of people in Bulawayo develop early greying. Early greying is due to genetic factors. Half of the population suggested that development of grey hair did not reduce their self esteem and the other half suggesting that it reduced their self esteem . The majority of the respondents were not aware of the effects of developing grey hair at an early age that could be the reason of getting a 50% of individuals who suggest that early greying does not lower their self esteem.

From the family tree, the mothers side had high development of early greying. The study reveals that woman grey ealier than their male counterparts.

Supporting the next generation of Biomedical Scientists