1) Explanatory variable: The new type of treatment

Response variable: The proportion of patients whose heart rate becomes stable

2) Confounding variable: Gender- any outcome that turns out to be different than expected could just be attributed to gender instead. This would mean it would be impossible to determine if any of the differences are attributed to the new drug.

3) Confounding variable: they would still have the same issue as before. They could assume that any differences in the desired outcome are attributed to how gender is distributed throughout the group. This would make it hard to tell why there are differences in heart rate

4) 2/3 or about 66.67%.

5) A) No. Because when you use the blocking strategies properly that should stop that from being possible

B) Yes. Other variables such as height could have an effect. You can expect a difference in heart rate from people who are much taller than those who are shorter.

6) Group 1 proportion male is 83% Group 2 is 50% male and the difference is 33%

7) I got 23% difference between the two groups compared to 33% the first time around.

8)

9) Random assignment is not a perfect way to balance the sex pf the patience within the group. It does however tend to make them ruffly the same when distributing the different sexes into the groups. The graph shows how it tries to keep the distribution spread out evenly with a main emphasis place at the median.

10) On average height is distributed ruffly equally the same between the two. The graph helps demonstrate this by forming a ruffly equal triangle. Visually this demonstrates how they are distributed equally.

11) Random assignment's purpose is to ensure that the placebo and drug groups and similar in every aspect besides the treatment that is being tested. By doing this you aim to remove some confounding variable to then allow the explanatory variable to be tested more accurately. You would cross out the arrow pointing from the confounding variable to the explanatory variable

12) Yes. If you have done the random assignment to both the drug and placebo group and one group found and increate in the proportion who had a stable heart

rate you are able to conclude that the new drug had caused this to happen. By randomly assigning people to each group, it strengths casual inference between the drug as well as the stable heart rate.

13) I would say it is a convenience sample because people went out of their way to volunteer to take part. Whereas a random sample requires and equal chance of being selected within a target population. Random sampling requires more randomized recruitment and convenience sampling takes a more volunteer approach.

14) Question 14

a. Sampling Method (Convenience Sample): Subjects are volunteers. This often leads to generalizations of the sample that volunteered but causation is also needed when you are looking at things on a much larger scale because the volunteer sample might not always be fully representative of the wider population with atrial fibrillation.
b. Study Design (Random Assignment): The drug is randomly assigned to the subjects and the placebo group looks to ensure that solid casual inferences about the drug's effectiveness can be made. This ensures that differences in the outcomes can be attributed to the drug rather than a confounding variable. You can conclude causation rather than association.

15) Question 15

Study Design: Experiment

Sampling Method: The volunteers

Scope of inference: The random assignment of the vaccine and placebo can make it easier to draw conclusions about causation. It provides scientists the opportunity to assess the effectiveness of the vaccine on Covid 19. For most cases you can generalize to the volunteers who partook in the study, but caution should be taken when applying it to the wider world.

16) Question 16

Study Design: Observational study

Sampling method: Random sample (randomly selected 1000 US adults)

Scope of Inference: In this example you can identify associations between the status of the vaccine and if someone caught Covid 19, but causation cannot be inferred because there was no control of the assignment of vaccination. The results from this study can most likely be generalized to the broader US population of adults because the people were randomly selected.