Discovering the causal structure of the Hamilton Rating Scale for depression using causal discovery

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**Background**

Major Depressive Disorder (MDD) causes many negative consequences including suicide and disability and is one of the leading preventable causes of death in many countries.

The Hamilton Rating Scale for Depression is used to assess depressive symptom severity. It is,

- **validated psychometrically,**
- **administered clinically,**
- **consists of 17 categories of symptoms.**

Identifying the causal relationships between these 17 categories:

- Provides insights into depressive symptoms,
- Leads to new treatments for patient sub-populations.

**Methodology**

Utilizes data from 10 randomized clinical trials covering a total of 2,292 participants.

Employs causal discovery to discover the causal and correlational relationships among the MDD symptoms.

**Results**

Casual structure network with 7 causal relationships:

- HAM-D04 Insomnia – sleep onset
- HAM-D05 – HAM-D04
- HAM-D06 Insomnia – early morning
- HAM-D07 Work and activities
- HAM-D08 – HAM-D10
- HAM-D09 – HAM-D11
- HAM-D10 Apprehension, worry, etc.
- HAM-D11 Heart racing, sweating, etc.
- HAM-D12 Loss of sexual interest
- HAM-D13 Tiredness, pain
- HAM-D14 Loss of sexual interest
- HAM-D15 – HAM-D13
- HAM-D16 Illness anxiety disorder
- HAM-D17 Lack of insight
- HAM-D18 – HAM-D17
- HAM-D19 Feeling of guilt
- HAM-D20 Feeling of guilt
- HAM-D21 Depressed mood
- HAM-D22 – HAM-D21
- HAM-D23 – HAM-D22
- HAM-D24 – HAM-D23
- HAM-D25 – HAM-D24
- HAM-D26 – HAM-D25
- HAM-D27 – HAM-D26
- HAM-D28 – HAM-D27
- HAM-D29 – HAM-D28
- HAM-D30 – HAM-D29
- HAM-D31 – HAM-D30

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