

Supplement S1 – DAGs and supporting literature

Severe Post COVID-19 Condition after Mild Infection: Physical and Mental Health Eight Months Post Infection: A Cross-Sectional Study

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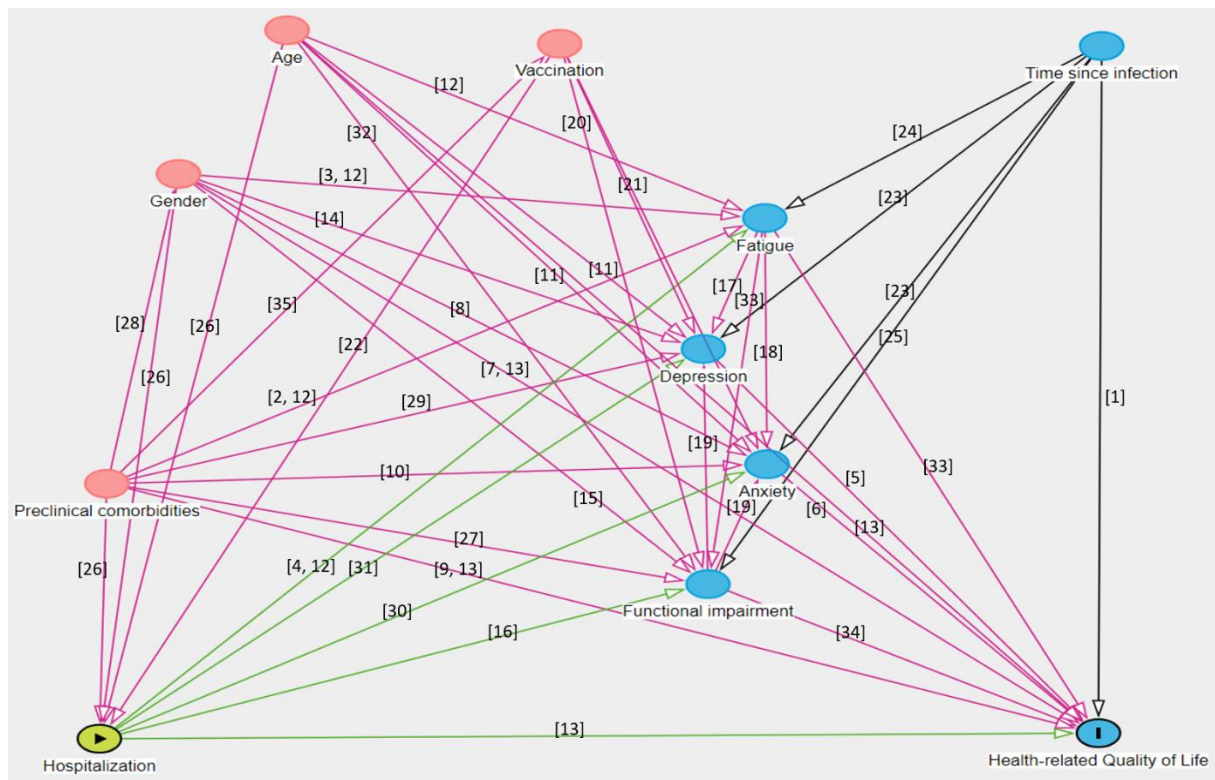
Literature for the DAGs:

- [1] Negative influence of fatigue on health-related quality of life (in ICU survivors) [Self-reported fatigue following intensive care of chronically critically ill patients: a prospective cohort study | Journal of Intensive Care | Full Text \(biomedcentral.com\)](#)
- [2] Fatigue is more frequent in persons with more preexisting medical comorbidities ([Post-COVID-19 Symptoms 2 Years After SARS-CoV-2 Infection Among Hospitalized vs Nonhospitalized Patients | Infectious Diseases | JAMA Network Open | JAMA Network](#))
- [3] Fatigue is more frequent in women ([Biomedicines | Free Full-Text | Trajectory of Post-COVID Self-Reported Fatigue and Dyspnoea in Individuals Who Had Been Hospitalized by COVID-19: The LONG-COVID-EXP Multicenter Study \(mdpi.com\)](#)); [Fatigue after COVID-19 in non-hospitalized patients according to sex - PubMed \(nih.gov\)](#)
- [4] Fatigue is more frequent in hospitalized patients ([Long COVID in hospitalized and non-hospitalized patients in a large cohort in Northwest Spain, a prospective cohort study | Scientific Reports \(nature.com\)](#))
- [5] Depression has a negative influence on HRQL in ICU survivors [Quality of Life, Depression, and Anxiety in Survivors of Critical Illness from a Greek ICU. A Prospective Observational Study - PMC \(nih.gov\)](#)
- [6] Anxiety has a negative influence on HRQL in ICU survivors ([Frontiers | The effect of anxiety and depression on the health-related quality of life of severe acute pancreatitis survivors: structural equation modeling approach \(frontiersin.org\)](#))
- [7] Women have a lower HRQL than men ([Gender differences in health-related quality of life in patients undergoing coronary angiography | Open Heart \(bmj.com\)](#); [Health-related quality of life of COVID-19 patients after discharge: A multicenter follow-up study - PubMed \(nih.gov\)](#))
- [8] Anxiety is more frequent in women ([Gender Effects on Depression, Anxiety, and Stress Regarding the Fear of COVID-19 - PMC \(nih.gov\)](#))
- [9] Comorbidities influence HRQL ([Health-related quality of life in intensive care survivors: Associations with social support, comorbidity, and pain interference | PLOS ONE](#))
- [10] Comorbidities are a risk factor for anxiety ([Prevalence and risk factors of COVID-19-related generalized anxiety disorder among the general public in China: a cross-sectional study - PMC \(nih.gov\)](#))

- [11] Age negatively influences anxiety and depression ([Psych | Free Full-Text | Risk Factors and Changes in Depression and Anxiety over Time in New Zealand during COVID-19: A Longitudinal Cohort Study \(mdpi.com\)](#))
- [12] Fatigue risk factors are old age, female gender, preclinical comorbidities, severe acute infection ([Frontiers | Post-COVID-19 fatigue: A systematic review \(frontiersin.org\)](#))
- [13] Risk factors for a decline in HRQL are gender, age, severe acute infection, preclinical comorbidity [Trajectories of health-related quality of life and their predictors in adult COVID-19 survivors: A longitudinal analysis of the Biobanque Québécoise de la COVID-19 \(BQC-19\) - PMC \(nih.gov\)](#)
- [14] Gender is a risk factor for depression ([COVID-19 depression and its risk factors in Asia Pacific – A systematic review and meta-analysis - ScienceDirect](#))
- [15] Risk factors for functional impairment: gender, oxygen therapy during acute disease [Risk factors and severity of functional impairment in long COVID: a single-center experience in Croatia - PMC \(nih.gov\)](#)
- [16] Severity of acute disease influences the degree of function impairments / post-COVID-19 condition [Impairments following COVID-19 infection: manifestations and investigations of related factors | Scientific Reports \(nature.com\)](#); [Risk factors for impaired respiratory function post COVID-19: A prospective cohort study of nonhospitalized and hospitalized patients - PubMed \(nih.gov\)](#)
- [17] Fatigue increases depression [Prevalence, trajectory over time, and risk factor of post-COVID-19 fatigue - PMC \(nih.gov\)](#); [Mental health outcomes following COVID-19 infection: impacts of post-COVID impairments and fatigue on depression, anxiety, and insomnia — a web survey in Sweden | BMC Psychiatry | Full Text \(biomedcentral.com\)](#)
- [18] Fatigue increases anxiety [Mental health outcomes following COVID-19 infection: impacts of post-COVID impairments and fatigue on depression, anxiety, and insomnia — a web survey in Sweden | BMC Psychiatry | Full Text \(biomedcentral.com\)](#)
- [19] Body impairments increase anxiety and depression [Mental health outcomes following COVID-19 infection: impacts of post-COVID impairments and fatigue on depression, anxiety, and insomnia — a web survey in Sweden | BMC Psychiatry | Full Text \(biomedcentral.com\)](#)
- [20] Less post-COVID 19 symptoms after vaccination ([Trajectory of long covid symptoms after covid-19 vaccination: community based cohort study - PubMed \(nih.gov\)](#)), [Impact of COVID-19 vaccination on the risk of developing long-COVID and on existing long-COVID symptoms: A systematic review - PubMed \(nih.gov\)](#), [Effect of covid-19 vaccination on long covid: systematic review - PubMed \(nih.gov\)](#)
- [21] Vaccination leads to less anxiety and depression [Mental health outcomes after SARS-CoV-2 vaccination in the United States: A national cross-sectional study - PubMed \(nih.gov\)](#)
- [22] Vaccines reduce severe or critical disease courses [Efficacy and safety of COVID-19 vaccines - PubMed \(nih.gov\)](#)
- [23] Anxiety and Depression decrease over time [Trajectory curves of post-COVID anxiety/depressive symptoms and sleep quality in previously hospitalized COVID-19 survivors: the LONG-COVID-EXP-CM multicenter study | Psychological Medicine | Cambridge Core](#)
- [24] Fatigue decreases over time [Biomedicines | Free Full-Text | Trajectory of Post-COVID Self-Reported Fatigue and Dyspnoea in Individuals Who Had Been Hospitalized by COVID-19: The LONG-COVID-EXP Multicenter Study \(mdpi.com\)](#)
- [25] Post-COVID symptoms improve over time [Trajectories of the evolution of post-COVID-19 condition, up to two years after symptoms onset - ScienceDirect](#)

- [26] Old age, comorbidities and male gender are risk factors for more severe COVID-19 diseases [Frontiers | Gender Differences in Patients With COVID-19: Focus on Severity and Mortality \(frontiersin.org\)](#)
- [27] Multimorbidity is associated with functional decline [Functional decline and associated factors in patients with multimorbidity at 8 months of follow-up in primary care: the functionality in pluripathological patients \(FUNCIPLUR\) longitudinal descriptive study - PMC \(nih.gov\)](#)
- [28] Differing patterns of multimorbidity by gender, with greater functional impairment in women and more comorbidity in men [Multimorbidity gender patterns in hospitalized elderly patients - PMC \(nih.gov\)](#)
- [29] Depression is more likely in persons with multimorbidity [Multimorbidity and depression: A systematic review and meta-analysis - ScienceDirect](#)
- [30] More anxiety in hospitalized COVID-19 patients [Frontiers | Post-acute COVID-19 symptom risk in hospitalized and non-hospitalized COVID-19 survivors: A systematic review and meta-analysis \(frontiersin.org\)](#)
- [31] More and longer hospitalization lead to more depression [Hospitalization and other risk factors for depressive and anxious symptoms in oncological and non-oncological patients - PubMed \(nih.gov\)](#)
- [32] Functional impairment and decline are common in middle age [Functional Impairment and Decline in Middle Age: A Cohort Study - PubMed \(nih.gov\)](#)
- [33] Fatigue is negatively correlated to health-related quality of life (and the physical component of the SF-36) [Quality of Life, Fatigue, and Physical Symptoms Post-COVID-19 Condition: A Cross-Sectional Comparative Study - PMC \(nih.gov\)](#)
- [34] Functional impairments / disability is related to decreased health-related quality of life [Correlation between functional disability and quality of life among rural elderly in Anhui province, China: a cross-sectional study | BMC Public Health | Full Text \(biomedcentral.com\)](#)
- [35] COVID-19 vaccination advise for persons with comorbidities [COVID-19 Vaccines Advice \(who.int\)](#)
- [36] COVID-19 vaccination reduces the risk for long-COVID [Impact of COVID-19 vaccination on the risk of developing long-COVID and on existing long-COVID symptoms: A systematic review - eClinicalMedicine \(thelancet.com\)](#)

DAG for health-related quality of life:



```
dag {
  "Functional impairment" [pos="-0.647,0.484"]
  "Health-related Quality of Life" [outcome,pos="0.040,1.011"]
  "Preclinical comorbidities" [pos="-1.705,0.129"]
  "Time since infection" [pos="0.046,-1.420"]
  Age [pos="-1.305,-1.479"]
  Anxiety [pos="-0.543,0.060"]
  Depression [pos="-0.655,-0.348"]
  Fatigue [pos="-0.547,-0.811"]
  Gender [pos="-1.579,-0.967"]
  Hospitalization [exposure,pos="-1.718,1.031"]
  Vaccination [pos="-0.908,-1.428"]
  "Functional impairment" -> "Health-related Quality of Life"
  "Functional impairment" -> Anxiety
  "Functional impairment" -> Depression
  "Preclinical comorbidities" -> "Functional impairment"
```

"Preclinical comorbidities" -> "Health-related Quality of Life"

"Preclinical comorbidities" -> Anxiety

"Preclinical comorbidities" -> Depression

"Preclinical comorbidities" -> Fatigue

"Preclinical comorbidities" -> Gender

"Preclinical comorbidities" -> Hospitalization

"Preclinical comorbidities" -> Vaccination

"Time since infection" -> "Functional impairment"

"Time since infection" -> "Health-related Quality of Life"

"Time since infection" -> Anxiety

"Time since infection" -> Depression

"Time since infection" -> Fatigue

Age -> "Functional impairment"

Age -> Anxiety

Age -> Depression

Age -> Fatigue

Age -> Hospitalization

Anxiety -> "Health-related Quality of Life"

Depression -> "Health-related Quality of Life"

Fatigue -> "Functional impairment"

Fatigue -> "Health-related Quality of Life"

Fatigue -> Anxiety

Fatigue -> Depression

Gender -> "Functional impairment"

Gender -> "Health-related Quality of Life"

Gender -> Anxiety

Gender -> Depression

Gender -> Fatigue

Gender -> Hospitalization

Hospitalization -> "Functional impairment"

Hospitalization -> "Health-related Quality of Life"

Hospitalization -> Anxiety

Hospitalization -> Depression

Hospitalization -> Fatigue

Vaccination -> "Functional impairment"

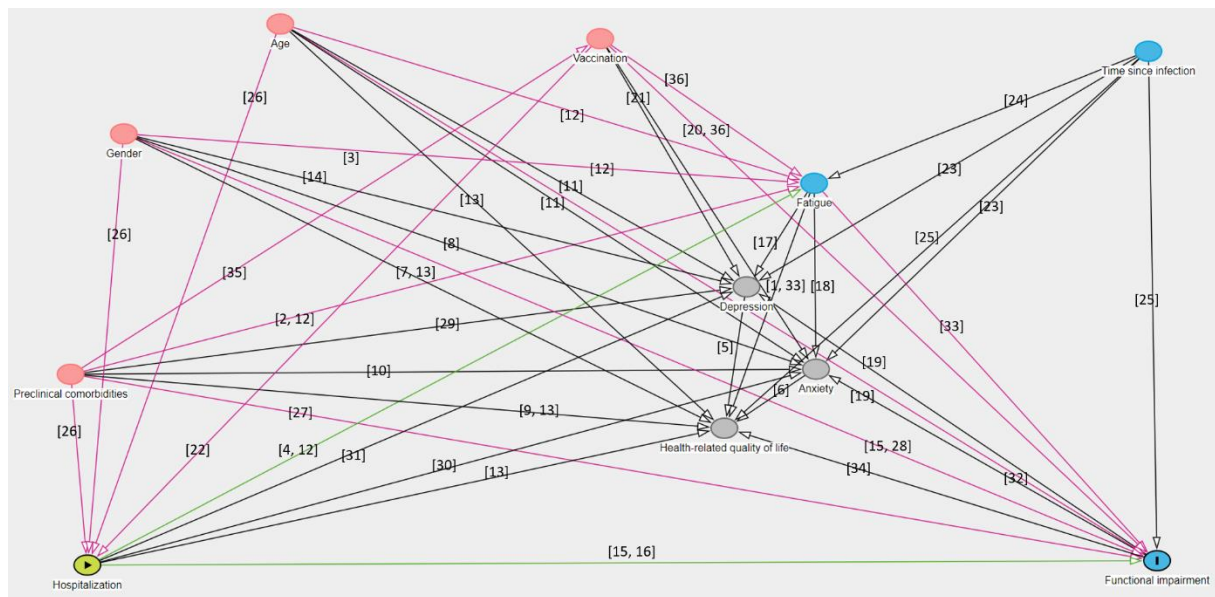
Vaccination -> Anxiety

Vaccination -> Depression

Vaccination -> Hospitalization

}

DAG für WHODAS / Functional impairment:



```
dag {  
  "Functional impairment" [outcome,pos="0.007,1.009"]  
  "Health-related quality of life" [pos="-0.691,0.352"]  
  "Preclinical comorbidities" [pos="-1.745,0.085"]  
  "Time since infection" [pos="-0.007,-1.516"]  
  Age [pos="-1.407,-1.651"]  
  Anxiety [pos="-0.543,0.060"]  
  Depression [pos="-0.655,-0.348"]  
  Fatigue [pos="-0.546,-0.861"]  
  Gender [pos="-1.659,-1.106"]  
  Hospitalization [exposure,pos="-1.718,1.031"]  
  Vaccination [pos="-0.891,-1.578"]  
  "Functional impairment" -> "Health-related quality of life"
```

"Functional impairment" -> Anxiety
"Functional impairment" -> Depression
"Preclinical comorbidities" -> "Functional impairment"
"Preclinical comorbidities" -> "Health-related quality of life"
"Preclinical comorbidities" -> Anxiety
"Preclinical comorbidities" -> Depression
"Preclinical comorbidities" -> Fatigue
"Preclinical comorbidities" -> Hospitalization
"Preclinical comorbidities" -> Vaccination
"Time since infection" -> "Functional impairment"
"Time since infection" -> "Health-related quality of life"
"Time since infection" -> Anxiety
"Time since infection" -> Depression
"Time since infection" -> Fatigue
Age -> "Functional impairment"
Age -> "Health-related quality of life"
Age -> Anxiety
Age -> Depression
Age -> Fatigue
Age -> Hospitalization
Anxiety -> "Health-related quality of life"
Depression -> "Health-related quality of life"
Fatigue -> "Functional impairment"
Fatigue -> "Health-related quality of life"
Fatigue -> Anxiety
Fatigue -> Depression
Gender -> "Functional impairment"
Gender -> "Health-related quality of life"
Gender -> Anxiety
Gender -> Depression
Gender -> Fatigue
Gender -> Hospitalization
Hospitalization -> "Functional impairment"

Hospitalization -> "Health-related quality of life"

Hospitalization -> Anxiety

Hospitalization -> Depression

Hospitalization -> Fatigue

Vaccination -> "Functional impairment"

Vaccination -> Anxiety

Vaccination -> Depression

Vaccination -> Fatigue

Vaccination -> Hospitalization

}