Developing a frailty concept in the OMOP CDM among sexual and gender minority older adults (age 50+) in the All of Us database

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Background

Frailty measured using the deficit accumulation method has high value for prognosis and health optimization for older adults because of its comprehensive view of patient health and flexibility to be applied across multiple data sources.(1-4) Yet frailty in the older sexual and gender minority (OSGM) population, a highly vulnerable subgroup, has not been studied. Moreover, frailty is not a standardized concept in many common data models, including the Observational Medical Outcomes Partnership Common Data Model (OMOP CDM). The All of Us Research Program deliberately collects data from vulnerable populations. Therefore it provides a unique opportunity to study frailty among OSGM and to create a frailty concept for the OMOP CDM.

Methods

We developed an All of Us deficit accumulation frailty index (AOU-FI) based on validated FIs(5-7) and using items in the baseline All of Us surveys from adults aged 50+ with complete data. Deficit items included concepts spanning comorbidities (18 concepts), physical functioning (9 concepts), mental health (6 concepts), and cognition (2 concepts). Two AOU-FI distributions were examined. The first, among older non-SGM adults (n = 13,357) in the All of Us data and the second among OSGM (n = 1,118; anyone answering "not straight" for the question about how they think of themselves or answering gender as "not man", "not woman", "skip", "prefer not to answer"). These distributions were compared to known FI distributions for two populations, a Canadian national sample of older adults(6) and people with intellectual disabilities(8), using t-tests. Principal components analysis of the deficit items evaluated independent contributions of each item.

Results

The AOU-FI is a ratio (range 0-1) with a maximum of 35-items worth up to 1 point each. Both AOU-FI distributions had expected gamma shapes (Figure 1). Among older AOU participants with complete data the mean FI=0.17 (sd=0.10; median=0.15), which was higher (p<.01) than the known Canadian FI distribution (mean=0.164; sd=0.098). Among OSGM with complete data the mean FI=0.19 (sd=0.11; median=0.17), which was higher than the known Canadian distribution, but was lower (p<.01) than the FI for people with intellectual disabilities (mean=0.27; sd=0.13). PCA demonstrated that the items selected are each making important contributions to the AOU-FI. Both AOU groups were >80% white. Older AOU were 42% male, 61% age 60 or younger and <1% had HIV. Among OSGM, 54% were male, 70% were age 60 or younger, and 5% had HIV. Compared to AOU older adults, the mean age of OSGM was significantly lower (65 [sd=8] vs 66 [sd=9]), but the AOU-FI was significantly higher (p<.01).
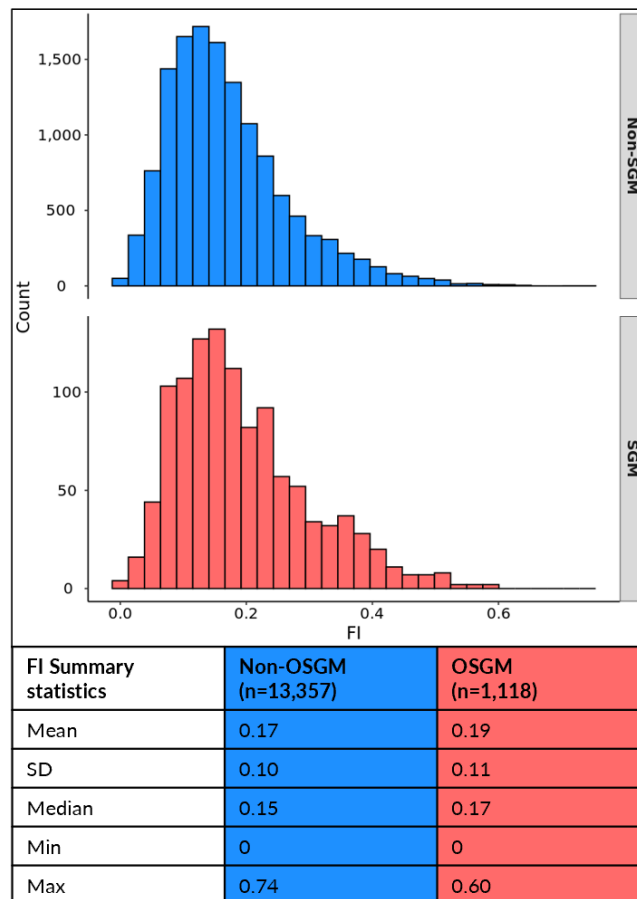
FI Summary statistics	Non-OSGM (n=13,357)	OSGM (n=1,118)
Mean	0.17	0.19
SD	0.10	0.11
Median	0.15	0.17
Min	0	0
Max	0.74	0.60

Figure 1. Comparing distributions of the All of Us – Frailty Index for the older sexual minority (OSGM) and general older All of Us populations.

Conclusion

Because All of Us deliberately collects data on vulnerable populations, it was expected and confirmed that the mean AOU-FI for the general older population was higher than the known distribution for older Canadians. In the same regard the OSGM population is a particularly vulnerable subpopulation and logically had a higher mean AOU-FI than the general older population but was not as high as the mean for people with intellectual disabilities. For this reason, the AOU-FI was determined to be consistent with shape and behavior of established FI distributions. Moreover, this work demonstrated that OSGM potentially have higher frailty at younger ages compared to a general older population. Adding the AOU-FI as a concept to the OMOP CDM for All of Us users will be critical to maximizing the utility of these data for studying vulnerable subpopulations of older adults.

References

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