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Mortality and morbidity among Danish blood donors; an unselected register based study (DoLifeBeAPerson)

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Introduction – DoLifeBeAPerson

Donor Lifestyle, Behavior, and Personality (DoLifeBeAPerson) uses data from:

- Danish National Health Surveys 2010 and 2013 (DNHS)
- Scandinavian donations and transfusions database (SCANDAT)
- Danish Registers

The healthy donor effect complicates the interpretation of donor health investigations. The components of the healthy donor effect have previously been described:

- Selection for good health at registration
- Selection for healthy individuals at the time of blood donation
- Long-time donors versus deferred donors
- Confounder effect



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Introduction – DoLifeBeAPerson

Questionnaire and health data are often gathered by different means and in different settings. Blood donors are most commonly asked about their health just before, during, or right after blood donation.

Identifying blood donors among participants in large scale health surveys offers the opportunity to mitigate this potential bias.

This initial study compares participation rates, self-perceived health, and mortality between active-, lapsed-, and non-donors using two nation-wide health surveys (DNHS 2010 and 2013).



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The Data

The DNHS datasets included:

- 298550 individuals invited in 2010 (177639 participated, **59.5%**)
- 300450 individuals invited in 2013 (162283 participated, **54%**)

Active and lapsed donors were identified using SCANDAT, resulting in three groups:

- Non-donors (no donations on record)
- Active donors (at least one donation within 2 years of the survey)
- Lapsed donors (at least one donation more than 2 years before the survey)

The datasets were limited to participants of age 18-67 years and cleaned

- 101419 individuals for the 2010 dataset
- 89161 individuals for the 2013 dataset



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The Data

- More female than male participants regardless of donor status
- The age distributions are similar for both DNHS 2010 and 2013
- The percentage of blood donors in the eligible Danish population is approx. 5.5%
 - More donors participated in both DNHS 2010 and 2013 than would be expected by chance

Age\Donor status	DNHS 2010			DNHS 2013		
	Active donors	Lapsed donors	Non-donors	Active donors	Lapsed donors	Non-donors
18-24	994	101	7661	1176	138	6852
25-34	1730	1121	10118	1501	1153	7283
35-44	2461	2028	18114	1833	2123	13278
45-54	2498	2329	20192	2244	2637	18235
55-64	1810	2478	21045	1567	2746	18702
65-67	180	659	5900	328	906	6459
Total	9673 (9.57%)	8716 (8.59%)	83030	8649 (9.7%)	9703 (10.88%)	70809



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Participation rates for active- and lapsed donors

Are blood donors more willing to participate in health surveys?

Logistic regression was used to determine the odds ratios (OR) for participation

Donor status	DNHS 2010		DNHS 2013	
	OR	95% CI	OR	95% CI
Active donors	2.89	[2.78, 3.01]	2.63	[2.63, 2.83]
Lapsed donors	2.14	[2.06, 2.22]	2.26	[2.17, 2.34]

For DNHS 2010 and 2013, donors were indeed more willing to participate when compared to the background population



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Self-reported health-related quality of life

Short-form 12 - Mental (MCS) and physical (PCS) component scores

Linear regression adjusted for age, gender, and regional residency

PCS	DNHS 2010			DNHS 2013		
	RC (score difference)	95% CI	p-value	RC (score difference)	95% CI	p-value
Active donors	2.13	[1.95, 2.30]	$< 2 * 10^{-16}$	2.27	[2.08, 2.45]	$< 2 * 10^{-16}$
Lapsed donors	0.38	[0.2, 0.57]	$4.26 * 10^{-5}$	0.86	[0.68, 1.04]	$< 2 * 10^{-16}$

MCS	DNHS 2010			DNHS 2013		
	RC (score difference)	95% CI	p-value	RC (score difference)	95% CI	p-value
Active donors	1.77	[1.58, 1.96]	$< 2 * 10^{-16}$	2.02	[1.82, 2.23]	$< 2 * 10^{-16}$
Lapsed donors	0.35	[0.15, 0.54]	$5.51 * 10^{-4}$	0.48	[0.28, 0.68]	$1.52 * 10^{-6}$

The differences were marginally reduced when lifestyle choices were taken into account and similar results were seen for transformed data



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Mortality of active- and lapsed donors

Interestingly, the better health reported by lapsed donors could not be identified in data on mortality

The mortality, depicted as hazard ratios (HR), of the three groups was investigated using Cox Regression

Mortality	DNHS 2010			DNHS 2013		
	HR	95% CI	p-value	HR	95% CI	p-value
Active donors	0.62	[0.49, 0.79]	$8.9 * 10^{-5}$	0.72	[0.49, 1.04]	0.08
Lapsed donors	1.01	[0.87, 1.17]	0.91	1.08	[0.87, 1.34]	0.46

The analyses were adjusted for gender, age, regional residency, smoking, BMI, income, alcohol intake, level of education, PCS, and MCS

Mortality	DNHS 2010		DNHS 2013	
	Individuals	Deaths	Individuals	Deaths
Non-donors	83030	1828	70809	701
Active donors	9673	71	8649	29
Lapsed donors	8716	194	9703	97



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Take home messages

- Identification of blood donors among participants in large population-based health surveys offers the opportunity to mitigate possible biases
- Active- and lapsed Danish blood donors report higher HRQoL than the non-donor population in an unselected study
- The mortality of lapsed donors is similar to that of non-donors
 - The healthy donor effect may be transient



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Possible future work

Investigate/compare diagnoses and prescriptions of the three groups

Describe modifiable lifestyle factors among donors;
factors such as alcohol intake, sleep patterns, smoking, and perceived stress

Analyses/predictions of donor stationarity (continued blood donation)

Risk behavior



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Thank you for listening

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