

Application of quantile mixed-effects model in modeling CD4 count from HIV-infected patients in KwaZulu-Natal, South Africa

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Additional file1: R package *qrLMM()* sample outputs using CAPRISA 002 Acute Infection Study data across all fitted quantile levels.

Quantile Regression for Linear Mixed Model

Quantile = **0.05** 0.25 0.5 0.75 0.85 0.95
Subjects = 235 ; observations = 7019

Estimates

- Fixed effects

	Estimate	Std. Error	Inf CI95%	Sup CI95%	z value	Pr(> z)
beta 1	19.99675	1.16072	17.72173	22.27177	17.22783	0.00000
beta 2	0.06294	0.01473	0.03407	0.09180	4.27392	0.00002
beta 3	-0.86567	0.14159	-1.14319	-0.58815	-6.11395	0.00000
beta 4	0.05642	0.02067	0.01590	0.09694	2.72903	0.00635
beta 5	-0.56383	0.07799	-0.71670	-0.41096	-7.22912	0.00000
beta 6	1.68287	0.05379	1.57744	1.78830	31.28520	0.00000
beta 7	0.02073	0.02500	-0.02826	0.06972	0.82939	0.40688

ii) Variance-Covariance Matrix

	z1	z2	z3
z1	24.80823	0.22416	-3.39361
z2	0.22416	0.03539	-0.26853
z3	-3.39361	-0.26853	2.72345

Model selection criteria

	Loglik	AIC	BIC	HQ
Value	-18454.68	36937.36	37033.35	36970.43

Details

Convergence reached? = TRUE
Iterations = 418 / 500
Criteria = 0.00046
MC sample = 20
Cut point = 0.25
Processing time = 2.725659 hours

Quantile Regression for Linear Mixed Model

Quantile = 0.05 **0.25** 0.5 0.75 0.85 0.95
Subjects = 235 ; observations = 7019

Estimates

- Fixed effects

	Estimate	Std. Error	Inf CI95%	Sup CI95%	z value	Pr(> z)
beta 1	22.17136	1.40335	19.42079	24.92193	15.79884	0.00000
beta 2	0.06979	0.01369	0.04296	0.09661	5.09845	0.00000
beta 3	-0.87112	0.12946	-1.12486	-0.61738	-6.72888	0.00000
beta 4	0.07836	0.02432	0.03070	0.12602	3.22263	0.00127
beta 5	-0.56874	0.10345	-0.77149	-0.36598	-5.49793	0.00000
beta 6	2.12541	0.07329	1.98176	2.26907	28.99856	0.00000
beta 7	0.02957	0.02972	-0.02868	0.08781	0.99496	0.31975

sigma = 0.68658

Random effects Variance-Covariance Matrix matrix

	z1	z2	z3
z1	17.94444	0.15706	-2.85704
z2	0.15706	0.02222	-0.19180
z3	-2.85704	-0.19180	2.12359

Model selection criteria

	Loglik	AIC	BIC	HQ
value	-17169.85	34367.69	34463.68	34400.77

Details

Convergence reached? = TRUE
Iterations = 477 / 500
Criteria = 0.00041
MC sample = 20
Cut point = 0.25
Processing time = 2.915623 hours

"Quantile Regression for Linear Mixed Model

Quantile = 0.05 0.25 **0.5** 0.75 0.85 0.95

Subjects = 235; Observations = 7019

Estimates

- Fixed effects

	Estimate	Std. Error	Inf CI95%	Sup CI95%	z value	Pr(> z)
beta 1	24.62849	1.46389	21.75927	27.49770	16.82404	0.00000
beta 2	0.05678	0.01285	0.03159	0.08197	4.41807	0.00001
beta 3	-0.69589	0.11792	-0.92702	-0.46477	-5.90142	0.00000
beta 4	0.08170	0.02699	0.02879	0.13461	3.02638	0.00248
beta 5	-0.64095	0.09631	-0.82972	-0.45219	-6.65513	0.00000
beta 6	2.56004	0.08808	2.38740	2.73268	29.06490	0.00000
beta 7	0.02935	0.03125	-0.03191	0.09060	0.93898	0.34774

sigma = 0.87713

Random effects Variance-Covariance Matrix

	z1	z2	z3
z1	17.69164	0.16071	-2.93488
z2	0.16071	0.02010	-0.18231
z3	-2.93488	-0.18231	2.03916

Model selection criteria

	Loglik	AIC	BIC	HQ
value	-16828.96	33685.92	33781.91	33718.99

Details

Convergence reached? = TRUE
Iterations = 433 / 500
Criteria = 0.00036
MC sample = 20
Cut point = 0.25
Processing time = 2.591965 hours"

Quantile Regression for Linear Mixed Model

Quantile = 0.05 0.25 0.5 **0.75** 0.85 0.95
Subjects = 235 ; observations = 7019

Estimates

- Fixed effects

	Estimate	Std. Error	Inf CI95%	Sup CI95%	z value	Pr(> z)
beta 1	26.59571	1.41986	23.81279	29.37863	18.73127	0.00000
beta 2	0.04600	0.01321	0.02011	0.07189	3.48205	0.00050
beta 3	-0.59311	0.11969	-0.82770	-0.35852	-4.95549	0.00000
beta 4	0.11195	0.03207	0.04910	0.17480	3.49109	0.00048
beta 5	-0.71365	0.09390	-0.89770	-0.52960	-7.59987	0.00000
beta 6	3.02180	0.09680	2.83208	3.21152	31.21830	0.00000
beta 7	0.02988	0.03154	-0.03194	0.09170	0.94725	0.34351

sigma = 0.70722

Random effects Variance-Covariance Matrix matrix

	z1	z2	z3
z1	19.23673	0.11625	-2.57316
z2	0.11625	0.01980	-0.18194
z3	-2.57316	-0.18194	2.04732

Model selection criteria

	Loglik	AIC	BIC	HQ
Value	-17344.63	34717.25	34813.24	34750.33

Details

Convergence reached? = FALSE
Iterations = 500 / 500
Criteria = 5e-04
MC sample = 20
Cut point = 0.25
Processing time = 4.430015 hours
Press [ENTER] to see next plot:

Quantile Regression for Linear Mixed Model

Quantile = 0.05 0.25 0.5 0.75 **0.85** 0.95
Subjects = 235 ; Observations = 7019

Estimates

- Fixed effects

	Estimate	Std. Error	Inf CI95%	Sup CI95%	z value	Pr(> z)
beta 1	27.97228	1.42043	25.18824	30.75631	19.69286	0.00000
beta 2	0.04132	0.01313	0.01559	0.06705	3.14764	0.00165
beta 3	-0.58146	0.12470	-0.82587	-0.33705	-4.66292	0.00000
beta 4	0.13131	0.03383	0.06500	0.19762	3.88101	0.00010
beta 5	-0.71471	0.08997	-0.89105	-0.53837	-7.94381	0.00000
beta 6	3.11409	0.09728	2.92342	3.30476	32.01100	0.00000
beta 7	0.02576	0.03215	-0.03725	0.08878	0.80134	0.42294

sigma = 0.52207

ii) Variance-Covariance Matrix

	z1	z2	z3
z1	23.36092	0.04613	-2.18991
z2	0.04613	0.02165	-0.19618
z3	-2.18991	-0.19618	2.17872

Model selection criteria

	Loglik	AIC	BIC	HQ
value	-17952.5	35933	36028.99	35966.07

Details

Convergence reached? = FALSE
Iterations = 500 / 500
Criteria = 0.00065
MC sample = 20
Cut point = 0.25
Processing time = 3.066678 hours

Quantile Regression for Linear Mixed Model

Quantile = 0.05 0.25 0.5 0.75 0.85 **0.95**
Subjects = 235; Observations = 7019

Estimates

- Fixed effects

	Estimate	Std. Error	Inf CI95%	Sup CI95%	z value	Pr(> z)
beta 1	31.38118	1.39665	28.64373	34.11862	22.46882	0.00000
beta 2	0.03366	0.01578	0.00273	0.06459	2.13293	0.03293
beta 3	-0.38521	0.16218	-0.70309	-0.06734	-2.37520	0.01754
beta 4	0.14515	0.03043	0.08551	0.20480	4.76972	0.00000
beta 5	-0.73982	0.08494	-0.90631	-0.57333	-8.70959	0.00000
beta 6	2.28722	0.08890	2.11298	2.46146	25.72899	0.00000
beta 7	0.01328	0.03032	-0.04615	0.07271	0.43812	0.66130

sigma = 0.2237

ii) Variance-Covariance Matrix

	z1	z2	z3
z1	33.52005	0.02446	-2.84757
z2	0.02446	0.03175	-0.29260
z3	-2.84757	-0.29260	3.29493

Model selection criteria

	Loglik	AIC	BIC	HQ
value	-19088.77	38205.55	38301.54	38238.62

Details

Convergence reached? = FALSE
Iterations = 500 / 500
Criteria = 0.00153
MC sample = 20
Cut point = 0.25
Processing time = 3.169162 hours