

Supplementary Table S1. Diagnostic utility of MDQ using serum magnesium level cut-off of 0.8 mmol/L.

	Pregnant women (N=765)				Women with hormone-related conditions (N=8836)			
	MDQ-62 score ≥ 30		MDQ ≥ 51		MDQ ≥ 30		MDQ ≥ 51	
	Value	95% CI	Value	95% CI	Value	95% CI	Value	95% CI
Sensitivity	0.845	0.815–0.872	0.283	0.248–0.320	0.884	0.874–0.893	0.248	0.236–0.260
Specificity	0.235	0.165–0.316	0.864	0.793–0.917	0.616	0.601–0.631	0.938	0.930–0.945
Positive predictive value^a	0.841	0.774–0.869	0.909	0.858–0.922	0.729	0.716–0.746	0.824	0.805–0.833
Negative predictive value^a	0.240	0.203–0.323	0.201	0.174–0.305	0.820	0.806–0.829	0.517	0.500–0.549
Positive likelihood ratio	1.105	0.999–1.221	2.074	1.326–3.242	2.300	2.209–2.394	4.010	3.523–4.564
Negative likelihood ratio	0.659	0.461–0.943	0.830	0.764–0.903	0.189	0.174–0.205	0.802	0.787–0.816
AUROC	0.630 ^b	0.581–0.679	0.630 ^b	0.581–0.679	0.789 ^b	0.780–0.799	0.789 ^b	0.780–0.799

^aNote that positive and negative predictive values are influenced by the prevalence of condition in the population that is being tested. ^bp-values for AUROC were $p < 0.0001$.

CI, confidence interval; MDQ, magnesium deficiency questionnaire.

Supplementary Table S2. Diagnostic utility of MDQ using serum magnesium level cut-off of 0.66 mmol/L.

	Pregnant women (N=765)				Women with hormone-related conditions (N=8836)			
	MDQ≥30		MDQ≥51		MDQ≥30		MDQ≥51	
	Value	95% CI	Value	95% CI	Value	95% CI	Value	95% CI
Sensitivity	0.887	0.843–0.922	0.358	0.301–0.418	0.927	0.915–0.938	0.310	0.290–0.331
Specificity	0.200	0.165–0.238	0.798	0.760–0.833	0.427	0.415–0.439	0.881	0.873–0.889
Positive predictive value^a	0.382	0.329–0.482	0.497	0.442–0.560	0.321	0.311–0.360	0.433	0.415–0.457
Negative predictive value^a	0.760	0.685–0.798	0.690	0.633–0.737	0.952	0.944–0.954	0.814	0.799–0.825
Positive likelihood ratio	1.108	1.042–1.178	1.774	1.400–2.248	1.617	1.579–1.656	2.615	2.385–2.866
Negative likelihood ratio	0.567	0.389–0.825	0.805	0.729–0.888	0.171	0.146–0.201	0.783	0.759–0.807
AUROC	0.645 ^b	0.604–0.686	0.645 ^b	0.604–0.686	0.741 ^b	0.730–0.752	0.741 ^b	0.730–0.752

^aNote that positive and negative predictive values are influenced by the prevalence of condition in the population that is being tested. ^bp-values for AUROC were p<0.0001.

CI, confidence interval; MDQ, magnesium deficiency questionnaire.

Supplementary Table S3. Development of MDQ-23.

Questions included in the original MDQ-62 questionnaire were tested for contribution to the overall score in a regression model based on magnesium below 0.8 mmol/L (Yes/no). In MDQ-62, each question contributed 2–5 points to the overall score; a score of ≥ 51 points indicated a 'highly probable' magnesium deficiency. In MDQ-23, each selected question was assigned a new value of 1–4 points that contributed to the overall score; a score of >9 points indicated magnesium deficiency.

Question number in MDQ-62	Question	Question score in MDQ-62	Regression coefficient	Standard error	p-value	Question score in MDQ-23
Q1	Excessive emotional stress	2	0.424	0.055	<0.0001	2
Q2	Irritable, or easily provoked to anger	3	0.492	0.062	<0.0001	2
Q3	Restless, or hyperactive	2				-
Q4	Easily startled by sound or light	4				-
Q5	Insomnia	2	0.302	0.051	<0.0001	1
Q6	Chronic headache or migraine	3				-
Q7	Convulsions	2	0.324	0.065	<0.0001	2
Q8	Tremor or shakiness in the hands	3				-
Q9	Fine, barely noticeable muscle twitching around your eyes, facial muscles, or other muscles of your body	3	0.311	0.059	<0.0001	1
Q10	Muscle spasms	3				-

Q11	Muscle spasms in hands or feet	3	0.332	0.059	<0.0001	2
Q12	Gag or choke from spasms in your oesophagus (food tube)	4	0.503	0.088	<0.0001	2
Q13	Asthma, shortbreathing, rales	3				-
Q14	Emphysema, chronic bronchitis, or high respiratory rate (tachypnea)	2				-
Q15	Osteoporosis	5				-
Q16	Kidney stone disease (urolithiasis)	3				-
Q17	Chronic kidney disease	2	0.452	0.068	<0.0001	2
Q18	Diabetes	4				-
Q19	Hyperfunction of the thyroid or parathyroid gland	3				-
Q20	High blood pressure	3				-
Q21	Mitral valve prolapse ('floppy heart valve')	4	0.824	0.139	<0.0001	4
Q22	Tachycardia, irregular heartbeat or arrhythmia	3				-
Q23	Chronic bowel disease, ulcerative colitis, Crohn's disease or irritable bowel syndrome	3				-
Q24	Frequent diarrhea or constipation	3	0.513	0.079	<0.0001	2
Q25	Suffer from premenstrual syndrome or menstrual cramps	3				-
Q26	Pregnant or recently pregnant	2				-
Q27	Take Digitalis (Digoxin)	3				-
Q28	Take any kind of diuretic	5	0.284	0.052	<0.0001	1

Q29	Recent radiation therapy or other type of radiation exposure	5				-
Q30	Have more than 7 alcohol drinks weekly	4	0.277	0.051	<0.0001	1
Q31	Problems with excessive alcohol intake	3				-
Q32	Take more than 3 portions of caffeine-containing drinks daily	2				-
Q33	Consumption of sugar-containing products	2				-
Q34	Crave carbohydrates and/or chocolate	2	0.352	0.056	<0.0001	2
Q35	Crave salt and/or salt products	2				-
Q36	Eat a high processed food/fast food diet	2				-
Q37	Eat a diet low in green, leafy vegetables, seeds and fresh fruit	2	0.257	0.056	<0.0001	1
Q38	Eat a low protein diet	2				-
Q39	Presence of undigested food or fat in feces	2				-
Q40	High blood pressure or pre-eclampsia in previous pregnancy	4				-
Q41	Chronic fatigue	2	0.275	0.055	<0.0001	1
Q42	Muscle weakness	2	0.473	0.053	<0.0001	2
Q43	Feeling of cold hands and/or feet	2				-
Q44	Numbness in face, hands or feet	2				-
Q45	Persistent tingling in body	2	0.487	0.086	<0.0001	2

Q46	Feeling of chronic indifference or apathy	2				-
Q47	Poor memory	2				-
Q48	Loss of concentration	2	0.237	0.053	<0.0001	1
Q49	Anxiety	3	0.383	0.051	<0.0001	2
Q50	Chronic depression for no apparent reason	2	0.528	0.066	<0.0001	2
Q51	Feelings of disorientation as to time or place	2				-
Q52	Feeling depressed, lack of personal identity	2				-
Q53	Hallucinations	2				-
Q54	Feeling of persecution and hostility from others	2				-
Q55	Pale and puffy face or poor, bad complexion	2				-
Q56	Loss of considerable sexual energy or vitality	2	0.368	0.052	<0.0001	2
Q57	Been told by your attending doctor that your blood calcium is low	2				-
Q58	Been told by your attending doctor that your blood potassium is low	3				-
Q59	Take calcium supplements regularly without magnesium	2	0.537	0.078	<0.0001	3
Q60	Take iron or zinc supplements regularly without magnesium	2				-
Q61	Chronic fluoride intake	2				-

Q62	Frequently use antibiotics, steroids, oral contraceptives, indomethacin, cisplatin, amphotericin B, cholestyramine, synthetic oestrogens	3	0.313	0.061	<0.0001	1
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MDQ, magnesium deficiency questionnaire.

Supplementary Table S4. Development of MDQ-10.

Questions included in the original MDQ-62 questionnaire were tested for contribution to the overall score in a regression model based on magnesium below 0.66 mmol/L (Yes/no). In MDQ-62, each question contributed 2–5 points to the overall score; a score of ≥ 51 points indicated a ‘highly probable’ magnesium deficiency. In MDQ-10, each selected question was assigned a new value of 1–4 points that contributed to the overall score; a score of >5 points indicated magnesium deficiency.

Question number in MDQ-62	Question	Question score in MDQ-62	Regression coefficient	Standard error	p-value	Question score in MDQ-10
Q1	Excessive emotional stress	2	0.554	0.065	<0.0001	3
Q2	Irritable, or easily provoked to anger	3	0.684	0.079	<0.0001	3
Q3	Restless, or hyperactive	2				-
Q4	Easily startled by sounds or lights	4				-
Q5	Insomnia	2	0.552	0.058	<0.0001	3
Q6	Chronic headaches or migraines	3				-
Q7	Convulsions	2				-
Q8	Tremor or shakiness in the hands	3				-
Q9	Fine, barely noticeable muscle twitching around your eyes, facial muscles, or other muscles of your body	3				-
Q10	Muscle spasms	3				-
Q11	Muscle spasms in hands or feet	3				-

Q12	Gag or choke from spasms in your oesophagus (food tube)	4				-
Q13	Asthma, shortbreathing, rales	3				-
Q14	Emphysema, chronic bronchitis, or high respiratory rate (tachypnea)	2				-
Q15	Osteoporosis	5				-
Q16	Kidney stone disease (urolithiasis)	3	0.543	0.103	<0.0001	3
Q17	Chronic kidney disease	2				-
Q18	Diabetes	4				-
Q19	Hyperfunction of the thyroid or parathyroid gland	3				-
Q20	High blood pressure	3				-
Q21	Mitral valve prolapse ('floppy heart valve')	4	0.793	0.121	<0.0001	4
Q22	Tachycardia, irregular heartbeat or arrhythmia	3				-
Q23	Chronic bowel disease, ulcerative colitis, Crohn's disease or irritable bowel syndrome	3				-
Q24	Frequent diarrhea or constipation	3	0.554	0.073	<0.0001	3
Q25	Suffer from premenstrual syndrome or menstrual cramps	3				-
Q26	Pregnant or recently pregnant	2				-
Q27	Take Digitalis (Digoxin)	3				-
Q28	Take any kind of diuretic	5				-

Q29	Recent radiation therapy or other type of radiation exposure	5				-
Q30	Have more than 7 alcohol drinks weekly	4				-
Q31	Problems with excessive alcohol intake	3				-
Q32	Take more than 3 portions of caffeine-containing drinks daily	2				-
Q33	Consumption of sugar-containing products	2				-
Q34	Crave carbohydrates and/or chocolate	2				-
Q35	Crave salt and/or salt products	2				-
Q36	Eat a high processed food/fast food diet	2				-
Q37	Eat a diet low in green, leafy vegetables, seeds and fresh fruit	2				-
Q38	Eat a low protein diet	2				-
Q39	Presence of undigested food or fat in feces	2				-
Q40	High blood pressure or pre-eclampsia in previous pregnancy	4				-
Q41	Chronic fatigue	2				-
Q42	Muscle weakness	2				-
Q43	Feeling of cold hands and/or feet	2				-
Q44	Numbness in face, hands or feet	2				-
Q45	Persistent tingling in body	2	0.571	0.076	<0.0001	3

Q46	Feeling of chronic indifference or apathy	2	0.766	0.069	<0.0001	4
Q47	Poor memory	2				-
Q48	Loss of concentration	2				-
Q49	Anxiety	3				-
Q50	Chronic depression for no apparent reason	2				-
Q51	Feelings of disorientation as to time or place	2				-
Q52	Feeling depressed, lack of personal identity	2				-
Q53	Hallucinations	2				-
Q54	Feeling of persecution and hostility from others	2				-
Q55	Pale and puffy face or poor, bad complexion	2				-
Q56	Loss of considerable sexual energy or vitality	2				-
Q57	Been told by your attending doctor that your blood calcium is low	2	0.571	0.076	<0.0001	3
Q58	Been told by your attending doctor that your blood potassium is low	3				-
Q59	Take calcium supplements regularly without magnesium	2	0.766	0.069	<0.0001	2
Q60	Take iron or zinc supplements regularly without magnesium	2				-
Q61	Chronic fluoride intake	2				-

Q62	Frequently use antibiotics, steroids, oral contraceptives, indomethacin, cisplatin, amphotericin B, cholestyramine, synthetic oestrogens	3				-
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MDQ, magnesium deficiency questionnaire.