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Translation and validation of the German version of the Mother-Generated Index and its application during the postnatal period



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ABSTRACT

Objective: the Mother-Generated Index (MGI) is a validated tool to assess postnatal quality of life. It is usually administered several weeks or months after birth and correlates with indices of post partum mood states and physical complaints. The instrument had not been translated into German before or validated for use among German-speaking women, nor have the results of the tool been assessed specifically for the administration directly after birth. This paper aims to describe the systematic translation process of the MGI into German and to assess the convergent validity of the German version of the instrument directly after birth and seven weeks post partum.

Design: prospective two-stage survey.

Setting: two rural hospitals in the south of Germany and in the north of Switzerland.

Participants: all women giving birth between 1st October and 15th December 2012 with sufficient knowledge of German and whose babies were not referred to a neonatal care unit; 226 women were eligible to participate.

Measurement instruments: two questionnaires including questions relating to socio-demographic factors and perinatal care, and incorporating the MGI, the Hospital Anxiety and Depression Scale (HADS) and the Postnatal Morbidity Index (PMI). All instruments were subjected to forward and back translation and pilot-tested; the first questionnaire was then administered in the first two days after birth and the second six weeks post partum. Parametric and non-parametric tests were computed using SPSS.

Findings: 129 surveys were returned an average of three days after birth and 83 after seven weeks. Higher postnatal quality of life showed a significant correlation with a lower anxiety and depression score ($p < 0.01$), fewer maternal physical complaints ($p < 0.05$) and more favourable baby adjective scores ($p < 0.05$) after birth. Significant associations were found between MGI scores and sufficient help ($p = 0.03$) as well as ability to cope at home ($p < 0.01$). MGI scores three days and seven weeks after birth correlated highly significantly and positively ($p < 0.001$).

Key conclusions: convergent validity of the MGI with the HADS and the PMI suggests that the German version of the MGI is a valid indicator of physical and emotional post partum well-being.

Implication for practice: the German version of the MGI can be used in the post partum period to identify women whose quality of life is impaired during the first days after birth, in order to initiate extended midwifery care and referral if necessary.

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Introduction

Assessing and promoting the quality of life of mothers is essential to midwifery care. Quality of life after childbirth

indicates how well women are managing the transition into motherhood (Nelson, 2003; Da Costa et al., 2006; Sadat et al., 2014). In practice, assessing and promoting quality of life is a challenge with numerous inconsistent definitions of the term (Farquhar, 1995). Quality of life is generally characterised by its subjective nature (Anderson and Burckhardt, 1999). Attempts to measure it aim to reflect the degree of satisfaction with multiple dimensions of life including health, social and psychological factors such as self-esteem, social support and negative affect. Moreover, the changeability of women's perception of their

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quality of life during the postnatal period has been recognised (Emmanuel and Sun, 2013).

Low social and emotional support as well as financial concerns are associated with lower postnatal quality of life (Webster et al., 2011; Zubaran and Foresti, 2011; Mogos et al., 2013). More than 80% of women complain of at least one health-related problem whilst in hospital and up to eight weeks following birth (Glazener et al., 1993). A lower standard of physical health in the early postpartum period has been found to be associated with a lower standard of mental health during the first year after birth (Woolhouse et al., 2014). Studies have concluded that postnatal depression is associated with an impaired postnatal quality of life (Da Costa et al., 2006; Darcy et al., 2011; Sadat et al., 2014). The course taken by depression in such cases depends on women's individual coping strategies (Besser and Priel, 2003) and can be reduced by pre- and postnatal health information (Youash et al., 2013).

The Mother-Generated Index (MGI) was developed by Symon et al. (2003a,b) as an instrument to identify women during postnatal check-ups who are in need of further follow-up (Symon et al., 2002). It is the first such tool especially designed for use in a maternity setting (Symon, 2003). The MGI consists of a single-sheet, three-step questionnaire and measures subjective quality of life (Symon et al., 2003b; Symon, 2012). Women answering the questionnaire are themselves able to identify areas of life affected by having a baby; thus no rigidly predefined checklist of problems is provided (Symon et al., 2002). In contrast to other quality of life measures, the MGI measures quality of life as the women perceive it (Symon et al., 2002). It therefore reflects how mothers feel and respects the subjective nature of quality of life.

The MGI was validated against established measures of physical and psychological well-being (Symon et al., 2003b). Six to eight weeks after birth, significant correlations were found with the Edinburgh Postnatal Depression Scale (EPDS), with the maternal physical morbidity part of the Postnatal Morbidity Index (PMI) and with the Maternal Adjustment and Maternal Attitudes scale (MAMA). Six to eight months after birth, significant correlations were found with the EPDS, the MAMA scale and the PMI, including maternal and infant physical morbidity and a baby adjective score (Symon et al., 2003b). The correlations after six to eight months were stronger than after six to eight weeks. The author did not validate the MGI against other quality of life tools. Symon et al. (2003b) recognised as a limitation that associations between MGI scores and social support were not assessed. Symon and Dobb (2008, 2011) found that the MGI was an acceptable tool in late pregnancy and that a follow-up during the postnatal period was feasible.

The MGI has been translated into several languages including Mandarin, Polish, Hindi, Farsi and Portuguese (Nagpal et al., 2008; Zhou et al., 2008; Khabiri et al., 2013; Symon et al., 2013), but not into German. Not all translations were translated back into English or were devised using a multistep process (Symon et al., 2013).

The aims of this paper are to report on the systematic and rigorous process by which the MGI was translated into German and to assess the convergent validity of the German version during the first week post partum and again after seven weeks.

Method

Design and sample

This paper presents parts of a prospective two-stage survey conducted in two small rural hospitals with German-speaking women, situated in the south of Germany and in the north of Switzerland. Both hospitals were located in the same geographical

area within five kilometres of the border, had 550–650 births per year and did not offer neonatal intensive care. The hospitals were very similar, representing typical small hospitals in both countries, to allow for cross-cultural comparison (Grylka-Baeschlin et al., submitted for publication).

All women who gave birth in either hospital between 1st October and 15th December 2012 were included in the study, except women with insufficient knowledge of German ($n=10$) or whose baby was in a neonatal intensive care unit ($n=4$). A total of 240 women gave birth during the defined time span, 136 in the German and 104 in the Swiss hospital. Hence 226 questionnaires were distributed in the first two days after birth, 131 in Germany and 95 in Switzerland. The response rate of this first questionnaire was 57.1% ($n=129$); the surveys were completed after an average of 3.05 days (range=1–28 days). Of these 129 women, 98 (76%) agreed to receive the second questionnaire after six weeks. The response rate of the second questionnaire was 84.7% ($n=83$) with a mean completion time of 7.05 weeks post partum (range=5.5–15 weeks).

In most studies the MGI has been administered during interviews (Symon et al., 2013). In the current study, participants self-completed the MGI as part of a broader survey. Participants were given written and verbal information about the study, their voluntary participation and how to complete the MGI. All eligible women were asked to complete the MGI prior to completing the rest of the questionnaire, an approach adopted from Symon and Dobb (2008). The principal investigator visited both hospitals at least every second day to invite potential candidates. If possible, women were approached a second time and thus reminded to complete and return the survey. Six weeks after birth the second questionnaire was sent by post to all women who provided their postal address after completing the first questionnaire. The women were asked to return it in the stamped envelope provided. Reminders were sent by email or post. Participants were offered a small token of appreciation if they completed both questionnaires.

Ethical considerations

The research was approved by the Ethics Committee of Hannover Medical School (1556-2012). All participants received verbal and written information about the study, including voluntary nature of the study and their right to withdraw at any time without suffering any disadvantage. Participants gave written consent and data were anonymised.

Study instruments

The MGI was accompanied by two different questionnaires, which were administered with it about six weeks apart. It was decided to use a similar approach for the validation as adopted by Symon et al. (2003b) assessing convergent validity. Hence, the questionnaires incorporated the Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith, 1983), the PMI (Glazener et al., 1995; Symon et al., 2003b; Glazener, 2005), and questions relating to socio-demographic factors, perinatal care, support and coping.

The MGI asks mothers to identify up to eight areas of life affected by having a baby. In a second step, the women then score these areas on visual analogue scales between one and 10; and in a third step they allocate 20 spending points to the areas most important to them (Symon et al., 2002). A primary and secondary score can be calculated (Symon et al., 2002) (Fig. 1). MGI primary scores correspond to the means of the values on the visual analogue scales in step two of the MGI, in which women scored the areas of life identified in step one. Secondary scores are computed from the sums of the same values on the visual analogue scales in step two multiplied by the spending points

Step 1	Step 2	Step 3
Partnership	0-----1-----2-----3-----4-----5-----6-----7-----8-----9-----10	4
Feelings for baby	0-----1-----2-----3-----4-----5-----6-----7-----8-----9-----10	8
Work	0-----1-----2-----3-----4-----5-----6-----7-----8-----9-----10	2
Social life	0-----1-----2-----3-----4-----5-----6-----7-----8-----9-----10	6

MGI primary score: mean of the values on the visual analogue scales: $(8+10+3.5+4):4=6.38$

MGI secondary score: sum of the values on the visual analogue scales multiplied by the step 3 value and divided by 20: $((8 \times 4) + (10 \times 8) + (3.5 \times 2) + (4 \times 6)) : 20 = 7.15$

Fig. 1. Calculation of the MGI scores (example).

allocated in step three and divided by 20. Both scores consist of values between zero and 10.

The HADS is a validated self-assessment tool consisting of 14 items subdivided into an anxiety and a depression subscale (Zigmond and Snaith, 1983). The instrument has been used in hospitals and in community (Zigmond and Snaith, 1983) and in a survey during the first week after birth and again eight weeks post partum alongside the PMI (Glazener et al., 1993, Glazener, 2005). HADS items are scored on a four-point scale, with zero points for the most positive and three for the most negative answer (Herrmann, 1997), leading to a range from zero to 42. Higher scores correspond to a higher probability of anxiety and depressive disorder (Brennan et al., 2010). The current study used a self-translated version of the instrument, which is slightly adapted to post partum women. It was recognised at an advanced stage of the study that a German version existed (Herrmann and Buss, 1994). Cronbach's alpha for this existing German HADS was 0.80 for the anxiety subscale and 0.82 for the depression subscale. The self-translated HADS in this study was devised by a rigorous and transparent process of forward and back translation (see below). Cronbach's alpha for the HADS during the first week after birth ($n=128$) was 0.75 for the anxiety subscale and 0.73 for the depression subscale. Seven weeks after birth, with a relatively small sample ($n=82$), Cronbach's alpha was computed at 0.76 for the anxiety subscale and 0.65 for the depression subscale.

The PMI, developed by Glazener et al. (1993, 1995), was also used by Symon et al. (2003b) for the validation of the MGI. Three components are included in the PMI: maternal physical morbidity, infant physical morbidity and a descriptive list of baby adjectives (Glazener et al., 1995; Glazener, 2005). The maternal and infant morbidity components of the index allow identification and measurement of physical health problems that may be experienced by the mother and the baby. The descriptive list included eight positive and eight negative baby adjectives and was interpreted following Glazener (2005), who computed a score by subtracting the sum of negative adjectives from the sum of positive adjectives, leading to a range of scores between minus eight and plus eight.

Questions relating to socio-demographic aspects and perinatal care were taken from existing maternity surveys described in the literature (Glazener et al., 1993; Redshaw and Heikkila, 2010). These surveys were reviewed for relevant questions. Additionally, women were asked about support at home. Furthermore, they indicated how well they were coping at home on a five-point Likert-type scale. It was decided not to include a tool to assess social support, because of the length of the questionnaire, the inadequateness of the items for the postnatal period or not being available in German (Fydrich et al., 1999; Hopkins and Campbell, 2008).

Forward and back translation of the instruments

The two questionnaires, of which one was administered in the first two days after birth and the other six weeks later, were

translated into German and back into English using a multistep translation method and were pilot-tested with German-speaking mothers. In a literature review, Acquadro et al. (2008) found no standardised translation method or evidence that one method is superior, although a multistep method was recommended to assure the highest quality. Accordingly, a multistep forward and back translation method was chosen for the translation of both the MGI and the questionnaires. To ensure the required conceptual and cross-cultural equivalence, two native speakers with different professional backgrounds undertook the forward translation. One translator was the principal investigator, a midwife with practical experience to ensure accurate translation of clinical terms. A student studying English and ethnology served as the second forward translator and focused on experiential and conceptual equivalences. The back-translation of both German translations was performed by a native English speaker.

Special attention was paid to the harmonisation and reconciliation process which was performed in four steps. Firstly, the two back-translations were compared with the original to identify discrepancies in the translations and formulations that might be misunderstood. Secondly, the translators met to discuss disagreements and find consensus. Thirdly, experts from Germany, Austria and Switzerland evaluated the linguistic and cultural comprehensibility of the German version of the MGI in order to ensure that it was suitable for all German-speaking countries and so avoid the need for further translation in the future. Fourthly, the disagreements and final reconciliations were discussed by the principal investigator in consultation with her supervisors. The steps outlined above resulted in several minor phrasing and spelling adaptations in respect to the MGI. The Austrian expert identified the need to address women with more courtesy and two sentences of the MGI were reworded.

Comparing the self-translated German version of the HADS with the pre-existing German version by Herrmann and Buss (1994), minor differences of wording were observed. Items 2, 3, 7 and 9 showed major differences in formulation (Table 1).

Pilot testing

Both questionnaires including the MGI were pretested with five German-speaking mothers. The women were asked to complete the questionnaires and to highlight any difficulties. Following the cognitive debriefing method used by de Grahl et al. (2012), the participants, either alone or together with the principal investigator, filled in a form to evaluate language and content comprehension. Pretesting identified three areas of concern. The first issue was that women had difficulties in identifying areas of their lives that had been affected by having a baby. During pilot testing some women noted that the suggested examples of such areas had a strong focus on feelings and emotions. To address this issue, some examples were shortened and in several of them the part of the sentence 'how they feel about...' was not translated. The second difficulty appeared in step two of the MGI: here the

Table 1
Items with differences in German between original and self-translated version of HADS.

Original HADS in English	German version HADS (Herrmann and Buss, 1994)	Self-translated German version HADS (Grylka-Baeschlin, 2013)
2. I still enjoy the things I used to enjoy: <ul style="list-style-type: none"> ● Definitely as much ● Not quite so much ● Only a little ● Hardly at all 	2. Ich kann mich heute noch so freuen wie früher: <ul style="list-style-type: none"> ● Ganz genau so ● Nicht ganz so sehr ● Nur noch ein wenig ● Kaum oder gar nicht 	2. Ich freue mich noch immer an Dingen, an denen ich vor der Geburt Freude hatte: <ul style="list-style-type: none"> ● Auf jeden Fall so viel ● Nicht genau so viel ● Nur ein bisschen ● Überhaupt nicht mehr
3. I get a sort of frightened feeling as if something awful is about to happen: <ul style="list-style-type: none"> ● Very definitely and quite badly ● Yes, but not too badly ● A little, but it doesn't worry me ● Not at all 	3. Mich überkommt eine ängstliche Vorahnung, dass etwas Schreckliches passieren konnte: <ul style="list-style-type: none"> ● Ja, sehr stark ● Ja, aber nicht allzu stark ● Etwas, aber es macht mir keine Sorgen ● Überhaupt nicht 	3. Ich bekomme ein beängstigendes Gefühl, als ob etwas Schlimmes passieren wird: <ul style="list-style-type: none"> ● Auf jeden Fall und sehr schlimm ● Ja, aber nicht so schlimm ● Ein bisschen, aber es beunruhigt mich nicht ● Überhaupt nicht
7. I can sit at ease and feel relaxed: <ul style="list-style-type: none"> ● Definitely ● Usually ● Not often ● Not at all 	7. Ich kann behaglich dasitzen und mich entspannen: <ul style="list-style-type: none"> ● Ja, natürlich ● Gewöhnlich schon ● Nicht oft ● Überhaupt nicht 	7. Ich kann mich ruhig hinsetzen und fühle mich entspannt: <ul style="list-style-type: none"> ● Eindeutig ● Normalerweise ● Nicht oft ● Überhaupt nicht
9. I get a sort of frightened feeling like 'butterflies' in the stomach: <ul style="list-style-type: none"> ● Not at all ● Occasionally ● Quite often ● Very often 	9. Ich habe manchmal ein ängstliches Gefühl in der Magengegend: <ul style="list-style-type: none"> ● Überhaupt nicht ● Gelegentlich ● Ziemlich oft ● Sehr oft 	9. Ich bekomme ein erschreckendes Gefühl, wie wenn es im Bauch kribbeln würde: <ul style="list-style-type: none"> ● Überhaupt nicht ● Gelegentlich ● Ziemlich oft ● Sehr oft

women were asked to score how they were affected by the areas described in the first step and to mark on a visual analogue scale where they lay in a range from 'you couldn't feel any worse than this' to 'you couldn't feel any better than this'. The neutral verb 'affect' was translated as 'beeinflussen', which also means 'influence'. As a result, four women evaluated the influence of the area rather than their feelings about the area, or complained of the discrepancies between the instructions for the second step and what was to be scored. The instruction was therefore changed, and women were asked to score their feelings regarding the areas of life identified in the first step. The third area of feedback concerned difficulties of some mothers in completing the MGI form. Three of the 10 women did not complete it at all and one complained about the complexity of the tool and instructions. To enhance response and completion rates, all women in the main study received detailed verbal explanations on how to complete the MGI.

Data analysis

Descriptive statistics were computed to assess the characteristics of the participants and to describe the MGI scores. Internal consistency of the MGI items could not be calculated because the areas of life identified differed between women. Convergent validity of the MGI was computed by means of Pearson's correlation coefficient r between the MGI scores and the HADS and PMI scores respectively. The correlation between the MGI scores of the two stages was also calculated using Pearson's correlation coefficient. Associations between MGI scores and help at home were calculated with one-way ANOVA F for the normally distributed MGI primary score and with Kruskal–Wallis Test H for the MGI secondary score with its skewed distribution. The correlations between the MGI scores and the women's self-estimation of coping at home were computed with Pearson's correlation coefficient. Results were considered to be statistically significant where

$p < 0.05$. Analyses were performed using the statistics programme SPSS version 20.

Findings

Characteristics of participants

The age of the participants varied between 16 and 43 years, the mean age being 30.3 years. The sample included disproportionately more German than Swiss women (60.9% versus 25.8%), because some German women gave birth in the Swiss hospital but not vice versa. Some 13.3% of the women were neither German nor Swiss. More than half (57.0%) of the women had completed schooling only up to the equivalent of junior high school/GCSE level, 17.2% had a senior secondary school leaving certificate and 25.8% had a university degree. Nearly all (92.2%) lived with a partner.

Slightly more than half of the participants (55.8%) were primiparous. The caesarean section rate was 32.8%, whereas 5.5% of the babies were born by ventouse and 61.7% spontaneously. Epidural anaesthesia was used as a method of pain relief for 39% of the women.

Description of the MGI scores

Three days after birth, the mean MGI primary score was 7.20 (range=3.20–10.00) and the mean MGI secondary score was 7.84 (range=3.20–10.00). Women identified on average 5.10 areas of life affected by having a baby (range 1.00–8.00). After seven weeks the scores were lower than three days after birth, with a mean MGI primary score of 6.80 (range 3.33–9.50) and a mean MGI secondary score of 7.23 (range=2.86–9.75); at this time the women identified an average of 5.70 areas of life (range=3.00–8.00) as having been affected.

The MGI scores were not associated with age (primary score after birth: $p=0.09$), parity (primary score after birth: $p=0.91$) or mode of birth (primary score after birth: $p=0.45$).

Psychometric qualities of the translated MGI

Convergent validity was computed by assessing correlations between the MGI and HADS scores and between the MGI and PMI scores. MGI primary scores three days after birth correlated significantly and negatively with the HADS overall score ($p < 0.01$, Table 2) and with the HADS depression subscore ($p < 0.001$). However, there were no significant correlations between the MGI secondary score and the overall HADS score or between the MGI primary and secondary scores and the HADS anxiety subscore. Significant negative correlations were computed three days post partum between the MGI primary score and maternal physical problems ($p < 0.01$) as well as between the MGI primary and secondary scores and the baby adjective score (primary score: $p=0.045$; secondary score: $p < 0.01$).

Seven weeks after birth, significant negative correlations were found between the MGI primary and secondary scores and the HADS overall score (primary score: $p < 0.01$, secondary score: $p < 0.01$), the HADS depression subscore (primary score: $p < 0.01$; secondary score: $p=0.01$) and the anxiety subscore (primary score: $p < 0.01$; secondary score $p < 0.01$). The MGI primary scores seven weeks post partum correlated significantly and negatively with maternal physical problems ($p=0.02$). The MGI secondary scores correlated significantly and negatively with infant physical problems ($p=0.03$). The baby adjective score correlated significantly and positively with the MGI primary ($p=0.03$) and secondary scores ($p=0.01$).

Highly significant positive correlations were found between the MGI primary scores three days and seven weeks post partum ($r=0.56$, $p < 0.001$), and for the MGI secondary scores after three days and seven weeks ($r=0.54$, $p < 0.001$).

Table 2
Correlations between MGI and HADS/PMI scores after birth and after seven weeks.

MGI scores and HADS/PMI scores		After birth	After seven weeks
HADS score			
MGI primary score	n	121	81
	r, p	-0.25, < 0.01	-0.37, < 0.01
MGI secondary score	n	114	71
	r, p	-0.18, 0.05	-0.38, < 0.01
HADS anxiety subscore			
MGI primary score	n	121	81
	r, p	-0.13, 0.17	-0.36, < 0.01
MGI secondary score	n	114	71
	r, p	-0.07, 0.44	-0.38, < 0.01
HADS depression subscore			
MGI primary score	n	121	81
	r, p	-0.32, < 0.001	-0.30, < 0.01
MGI secondary score	n	114	71
	r, p	-0.25, < 0.01	-0.30, 0.01
Maternal physical problems			
MGI primary score	n	121	81
	r, p	-0.24, < 0.01	-0.25, 0.02
MGI secondary score	n	114	71
	r, p	-0.09, 0.36	-0.18, 0.14
Infant physical problems			
MGI primary score	n	121	81
	r, p	-0.12, 0.18	-0.19, 0.10
MGI secondary score	n	114	71
	r, p	-0.05, 0.59	-0.26, 0.03
Baby adjectives Glazener			
MGI primary score	n	120	81
	r, p	0.18, 0.045	0.24, 0.03
MGI secondary score	n	113	71
	r, p	0.29, < 0.01	0.30, 0.01

Support and coping at home

The MGI primary and secondary scores after seven weeks were significantly associated with sufficient help at home (primary score: $p=0.03$; secondary score: $p=0.02$) (Table 3). The post-hoc Tukey test showed a significant difference between the response options 'sometimes' and 'yes' ($p=0.04$), with more favourable scores if there was sufficient help (MGI primary score=7.21, MGI secondary score=7.78) compared to sometimes sufficient help (MGI primary score=6.37; MGI secondary score=6.67). Self-esteem with regard to coping at home correlated significantly and positively with both MGI scores (primary score: $p < 0.01$; secondary score: $p < 0.001$).

Discussion

This is the first study in which the MGI has been translated into German and validated with German-speaking women. It is also the first time the MGI has been administered both directly after birth and seven weeks post partum, which allows correlations to be investigated between these two stages of assessment. The study therefore offers deeper understanding of postnatal quality of life directly after birth and its development during the first seven weeks post partum.

Translation of the instrument

Symon et al. (2013) noted that women in the Indian, Chinese, Polish and Brazilian studies had difficulties in understanding the concept of quality of life. However, none has identified problems with translating the MGI into other languages. The present study by contrast revealed that the translation of even a short single-sheet form needs close attention to linguistic comprehension. This might be the result of the systematic multistep translation process (Acquadro et al., 2008). The study further showed that pilot-testing the translated instrument was an essential step which led to changes in wording.

Psychometric properties German MGI

With a view to validating the German version of the MGI, convergent validity was investigated by means of an assessment of the correlations between the MGI, HADS and PMI scores. The expected associations were demonstrated between postnatal quality of life and emotional distress, maternal physical problems and the way the child was perceived. Women with more favourable MGI scores showed a better mental and physical health status and perceived their child in a more positive way. However, the degrees of association between the scores were low.

This study was the first to investigate the correlations between MGI and HADS scores. Thus there were no comparative values

Table 3
Associations between MGI scores, help at home and coping at home.

MGI scores, support at home and coping at home	Participants	
Support at home		
MGI primary score	n	81
	F (df), p	3.74 (2), 0.03
MGI secondary score	n	71
	H (df), p	7.71 (2), 0.02
Coping at home		
MGI primary score	n	81
	r, p	0.37, < 0.01
MGI secondary score	n	71
	r, p	0.51, < 0.001

from other studies. However, the correlations between MGI and HADS scores were less than the correlations [Symon et al. \(2003b\)](#) found between the English-language version of the instrument and the EDPS. The use of different scales in the original Scottish study (MGI and EPDS) and the present study (MGI and HADS) makes this comparison difficult to interpret. However, the correlation between MGI and the HADS depression sub score during the first week post partum was stronger than between MGI and the HADS anxiety sub score. This may indicate that depression is more relevant for maternal well-being than anxiety directly after birth.

The correlations between MGI and PMI scores can be compared to the values assessed in the original study ([Symon et al., 2003b](#)). Comparison could be made only for the values after seven weeks, as no other study has assessed MGI scores especially during the first days after birth. The associations between the MGI primary scores and maternal physical problems were lower with the German version than with the original English-language version in Scotland ($r = -0.25$ versus correlation coefficient = -0.42). [Symon et al. \(2003b\)](#) did not find correlations between MGI primary scores and infant physical problems and did not report values for the MGI secondary scores. In the current study, the secondary scores correlated significantly with infant physical problems. The correlations between the MGI scores and the baby adjective score were also lower in the present study than in the Scottish study ($r = 0.24$, $p = 0.03$ versus correlation coefficient = 0.38 , $p < 0.01$).

Generally, lower correlations between MGI, HADS and PMI scores might be related to the quality of the translation. However, a rigorous and transparent translation method was used in this study, ensuring the quality of the German version of the instrument. Lower correlations could also be caused by differences in the samples between the Scottish study and the current study. [Symon et al. \(2003b\)](#) also found that the scales used to assess convergent validity showed higher correlations six months after birth than six weeks after birth. Thus the present study allowed for only a partial validation of the instrument. Further research seeking correlations between the German version of the MGI and other scales that measure related constructs and indicators of well-being (e.g. the EPDS) are needed, preferably using larger samples and also assessing correlations six months post partum.

Associations between MGI scores and social support and coping

Unlike other studies incorporating the MGI, the present study investigated associations between MGI scores, support at home and coping at home. Social life has been found to be an important aspect influencing quality of life ([Anderson and Burckhardt, 1999](#)). Thus the association between more favourable MGI scores and more support at home provided further evidence that MGI scores are associated with components of the construct of postnatal quality of life. Coping strategies influence symptoms of depression ([Besser and Priel, 2003](#)). The significant correlations between MGI scores and coping at home were a further indication that MGI scores are associated with mental health status as an important aspect of quality of life. Further research into associations between MGI scores and accepted measures of social support and coping is needed.

How useful is the MGI during the first week post partum?

The correlations of the MGI scores with the HADS and PMI scores three days after birth were low, but it was surprising that they were found at all, as [Symon et al. \(2003b\)](#) found higher correlations after six to eight months than after six to eight weeks. However, there are no comparative values, because to date no other study has used the MGI directly after birth. The follow-up of the present study allowed investigations of the correlations between the scores at the two stages of the survey. The highly significant correlations with Pearson's

correlation coefficient > 0.5 indicated that less favourable scores directly after birth were strongly associated with less favourable scores at seven weeks post partum. Thus the administration of the MGI in hospital would help identify women at risk of lower quality of life in the later postpartum period. The identification of women at risk before and not only after birth might be more meaningful as [Symon and Dobb \(2011\)](#) found a correlation between antenatal and postnatal MGI scores. However the correlational coefficients in the current study were similar immediately after birth and several weeks later, suggesting further research investigating the application of the MGI during the early postpartum period is necessary.

Strengths and weaknesses

The present study was the third largest study incorporating the MGI; nevertheless the sample size was small. One key strength was that all women giving birth within a defined time period were invited to participate in the study, making it more likely that the sample was representative of women giving birth in the selected German and Swiss hospitals. However, the response rate of just below 60% may imply that generalisations might be limited as no data from non-responders were analysed.

Assessing convergent validity of the German MGI with the HADS allowed assessing associations between postnatal quality of life and two different emotional distresses, depression and anxiety. However, the use of a self-translated HADS is another limitation. Only after data collection was it discovered that a validated German HADS ([Herrmann and Buss, 1994](#)) existed. However, the translation of the HADS scale was based on a multistep forward and back translation method. This gave the opportunity to compare the psychometric properties of the self-translated version with the existing German one. Internal consistency of the self-translated instrument was sufficient, with Cronbach's alpha of 0.75 and 0.73 for the anxiety and depression subscales respectively in the larger sample directly after birth. The values were lower than those of the original German HADS ([Herrmann and Buss, 1994](#)) with Cronbach's alpha of 0.80 and 0.82. However, taking into consideration the smaller size of the current sample (129 versus 3603 participants), the results were acceptable. [Table 1](#) compares differences in formulation highlighting that despite the meanings of most items being similar, the versions do differ.

The present study was the second to use self-completion of the MGI form after verbal instruction, instead of performing interviews with women who did not know the questionnaire beforehand. Some women encountered difficulties during MGI completion but, it was possible to calculate 94% of the MGI primary scores and 88% of the secondary scores. Nevertheless, difficulties in completing the form could indicate that some women did not understand the instructions and may have filled in the form unsatisfactorily. For these reasons the German version of the MGI might best be administered via interviews. In addition, interviews give health care providers a chance to talk to new mothers about their postnatal quality of life and to identify women who might need additional support.

Usefulness of the Mother-Generated Index for midwifery practice

More than 80% of the respondents indicated that antenatal care was provided only by a gynaecologist and not by a midwife. Therefore, midwives often do not have the opportunity to assess women's well-being during pregnancy. In many countries, midwifery care in the postpartum period is provided only during the first days and weeks after birth, hence it is essential to use this short period effectively. The findings of the present study suggest that the MGI administered directly after birth may allow timely identification of women at risk of long-term impairment of their quality of life.

Completing the MGI, women list areas of their life which are most important for them. This may allow care providers to identify women's worries and to enable targeted communication and counselling. Assessment of postnatal quality of life includes mental and physical aspects and may facilitate the implementation of the recommendations made by Woolhouse et al. (2014) that physical health problems should be assessed after birth and be addressed via early interventions to promote maternal mental health. There is also evidence that women at risk of postnatal depression profit from home visits (Shaw et al., 2006). Thus the use of the MGI directly after birth allows midwives to identify women in need of extra support who may profit from midwifery home care. Midwifery post partum support affords many opportunities to provide health information, which can reduce postnatal depression (Youash et al., 2013) and thus enhance postnatal quality of life. Even if midwives are not specialist mental health care providers, their role in supporting women after childbirth is important. The individual character of the MGI without predefined checklist distinguishes the tool from other instruments and helps midwives to guide the communication to the mentioned worries of the women. Postnatal quality of life impacts on the health and well-being of mothers and their families. The improvement of postnatal quality of life should be one of the main purposes of midwifery care in order to promote the health of childbearing women and their families.

Conflict of interest statement

There are no competing interests. The study was part of a self-funded MSC project by the first author.

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