

Care in Labor: A Swedish Survey Using the Bologna Score

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ABSTRACT: **Background:** An important part of midwives' area of responsibility is to strive to keep birth normal. Interventions during childbirth are costly and may disrupt the course of normal labor. The aim of this study was to describe, by use of the Bologna Score, how birth is managed in Sweden. **Methods:** A prospective cross-sectional study in a national sample was performed. All (n = 51) Swedish maternity units were invited to participate and 36 (70.6%) agreed. Midwives collected data, in accordance with the Bologna Score, for all deliveries occurring during a 2-week period in 2007. **Results:** Qualified health personnel assisted at almost all deliveries (99.9%), and a vaginal birth was planned for 84 percent of the women. A Bologna Score of 5 signifies that birth has been managed using recommended evidence-based practice, which was achieved for 22.7 percent of the planned vaginal births. Use of the supine position and some interventions were responsible for loss of points. The percentage of 5-point scores varied greatly among units (0–53.1%). **Conclusions:** The findings suggest that in Sweden, birth is managed according to scientific evidence to a limited degree. Large differences among units also suggest that care in childbirth is based on attitudes rather than on scientific evidence. The Bologna Score was easy to use and gave a good picture of how care was given at the participating maternity units. We suggest that the instrument is useful as a quality indicator for intrapartum care. (BIRTH 35:4 December 2008)

Key words: Bologna Score, evidence-based practice, intrapartum care, normal birth

The International Confederation of Midwives (1) states that part of the midwife's area of responsibility is to strive to keep birth normal, which is a recommendation that has been further endorsed by individual countries (2,3). A World Health Organization (WHO) document on care in normal birth states that the goal

of intrapartum care is to achieve a healthy mother and child using the least possible number of interventions compatible with safety (4). This goal is in accordance with the so-called midwifery (5), social (6), and life-event models of care (7), which all state that pregnancy is a critical, vulnerable, but normal part of women's lives. These models differ from the medical model in which pregnancy and birth are portrayed as a disease to be treated, and care is characterized by technology and medicine. In the medical model, the woman becomes a pregnancy and delivery that may be controlled like a machine in which errors in the machinery can be corrected.

International studies describe the large number of interventions that are part of midwives' care in childbirth (8–12). These interventions are applied irrespective of the assessment of women's status as low or high risk on arrival at the maternity unit (11,12). Researchers have shown that unnecessary interventions in childbirth increase health care costs by up to 50 percent for

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low-risk primiparous women and up to 36 percent for low-risk multiparous women when labor interventions are accrued (13).

Quality in intrapartum care has by convention been measured in terms of mortality and morbidity in women and their newborns (14). Sweden has among the lowest perinatal mortality (5/1,000 births) and maternal mortality (2/100,000) rates in the world (15) and almost all births (99%) occur in hospitals (16). Rates of cesarean sections, instrumental births, and low Apgar scores have also been used to measure the quality of childbirth care. In the industrial world, low Apgar scores and maternal/infant deaths and morbidity are rare events and their occurrence may be as much a reflection of the general health of a society as of the quality of childbirth care given. Furthermore, these outcome measures fail to describe the process, attitudes, and use of evidence-based practice in intrapartum care. Therefore, in addition to the above-mentioned medical outcomes, it has been suggested that measuring the process of intrapartum care is also important (17,18). Several research-based instruments have been developed to enable such measurement (18–21).

Chalmers and Porter constructed an evaluation tool from the WHO's recommendations that is known as the Bologna Score (19). This tool is based on the premises that normal birth should be demedicalized, based on the use of appropriate technology, should be evidence based, and should involve women in decision making. The tool assesses both attitudes and practices within maternity services, and its purpose is to indicate to observers how many births start as "normal" and how vaginal birth is managed within a given population.

An instrument to measure intrapartum care, which was developed by Sandin-Boj  et al and also based on the WHO's recommendations, was tested at a conventional Swedish maternity unit (18). These authors found that many practices suggested by WHO were demonstrably good and should be encouraged (11,12), but others with little or no scientific evidence were also used. Findings from their research indicate the need for further investigation of midwives' practices. The processes of intrapartum care and attitudes toward vaginal birth have not been clearly investigated in industrialized countries, and to our knowledge, no studies using the Bologna Score (19) have been published.

The aim of this study was to describe how birth is managed in Sweden, using the Bologna Score in a national survey.

Methods

Swedish midwives are responsible for the care of all women experiencing vaginal birth. They collaborate

with a physician when complications occur and when instrumental delivery becomes necessary. Our study took place in Sweden during a 2-week period in 2007. The Ethical and Research Committee at Karlstad University gave consent for the study.

Approximately 100,000 births occur each year in Sweden (22), which means approximately 1,900 births per week. From this figure, we estimated that if all 51 maternity units in Sweden participated in a 2-week Bologna Score survey, approximately 3,800 births (3.8% of annual births) would be included. All 51 Swedish maternity units were sent a letter of invitation to participate in the study. The invitation included a question about the numbers of births per week at individual units. Three reminders were sent, one by post and two electronically. Thirty-six units (70.6%) agreed to participate. Nine (17.3%) declined because of their own ongoing research ($n = 5$), rebuilding ($n = 2$), and vacancy for the post of midwife-in-charge ($n = 2$); six units (11.8%) did not respond.

Participating and nonparticipating hospitals and number of births per year at these units are shown in Table 1. In the participating hospitals, the rate of childbirth varied from approximately 200 to 5,000 births per year (median 1,630 births), and in the nonparticipating hospitals, the numbers varied from 700 to 5,000 (median 2,500 births). Hospitals that declined participation or who did not answer the invitation had significantly more deliveries per year ($p = 0.011$) than the participating hospitals.

Study Design

The Bologna Score

The Bologna Score tool consists of three indicators (19). Indicator A is a proxy measurement for compliance with the requirements for a safe delivery and is measured as the percentage of women attended by a skilled attendant during labor. Indicator B is used to estimate the number of women falling outside the scope of the definition of normal labor and is

Table 1. Maternity Units Invited to Join the Study ($n = 51$)

Number of Births/Year	Yes	No	No Answer
> 4,000	1	1	3
3,000–3,999	3	2	0
2,000–2,999	7	3	0
1,000–1,999	13	2	3
< 1,000	12	1	0
Total	36	9	6

measured by the percentage of women with induced labor or undergoing elective cesarean section.

Indicator C is the Bologna Score and is composed of five questions, which are posed for every delivery not falling within indicator B and include 1) whether a companion to the woman was present at birth (this item reflects the adoption of evidence-based care, attitudes of caregiver, and the women's involvement in maternity care services); 2) whether a partogram was used (this item reflects effective monitoring of labor and demonstrates that caregivers recognize the importance of objectively assessing labor progress); 3) absence of augmentation, including external physical pressure on the fundus or emergency cesarean section (this item indicates persisting normal labor progress as judged by the professionals); 4) whether the woman gave birth in a nonsupine position, which excludes most instrumental births (this item reflects the presence of evidence-based practice and the attitudes of caregivers); and 5) whether skin-to-skin contact between mother and baby was maintained for at least 30 minutes during the first hour after birth, thereby excluding infants requiring intensive care (this item reflects the presence of evidence-based practice and indicates the attitudes of caregivers).

Each delivery is assessed and one point given for each of the five Bologna Score questions for which an affirmative answer is given. Thus, the maximum score for each delivery is five and the minimum score is nil (19). A score of five infers that the birth has been managed according to the best available evidence for care in normal birth.

Preparation and Testing of the Questionnaire

The Bologna Score tool was translated, using the "back-translation" method (23). It was translated into Swedish by the first author who is a native Swedish speaker and then retranslated into English by the second author, whose is a native English speaker. The retranslated questionnaire was sent to one of the constructors of the Bologna Score tool to check for authenticity in translation. Background variables ($n = 7$) and study-specific questions ($n = 3$) were added to the Bologna Score to form a questionnaire. The background variables were gestational week at birth, parity, nicotine habits, body mass index (BMI) at booking, civil status, and whether or not in active labor on arrival and at low risk on arrival at the maternity unit. Low risk was defined as gestational week $37 + 0$ to $41 + 6$, the fetus in a vertex position, normal fetal heart rate (110–150 beats/min), spontaneous labor, no current or previous obstetric complications, and no medical disease requiring specialist care. The three study-specific questions referred to

Apgar scores at 5 minutes, use of epidural anesthesia, and the question "Do you as a midwife assess this birth as normal?"

A pilot study including 50 births was conducted in two different hospitals to test the questionnaire's content validity and feasibility. The pilot study showed that the questionnaire functioned well and no changes were made. Interrater reliability of the questionnaire was tested by the first author and a clinical midwife by using the medical records of women who had recently given birth. Twenty sets of medical records were evaluated and agreement on indicators A and B was 100 percent. For indicator C, agreement was 100 percent for those questions that were possible to evaluate. The presence of a companion to the woman and the occurrence of skin-to-skin contact between mother and baby postpartum could not be evaluated because they were not documented in the medical records.

Data Collection

One week before the study started, all participating units were sent a letter of instruction, which included sequentially numbered questionnaires. An extra 10 percent was added to the expected number of deliveries at each unit to ensure that the number of questionnaires would be sufficient. Registration forms requesting data on age, parity, gestational age, mode of delivery for study dropouts, and the number of births during the study period were included.

The assisting midwife completed a questionnaire after each birth and before the woman left the maternity unit. The questionnaires were collected in a box at the maternity units and returned to the first author by the chief midwife. All questionnaires from each unit were registered in the research database. When it was apparent that number succession had been broken, but no dropout registration had been made, the first author contacted the unit and asked for details of the missing questionnaires.

Data Analysis

The data were processed using the Statistical Package for Social Sciences (24). The Student t test was used to compare differences in mean age between those with and without a completed questionnaire. Fisher's exact test (χ^2) was used to test for differences in other background variables measured on categorical scales between those with and without a completed questionnaire. Odds ratios with 95% confidence intervals were calculated for the likelihood of a 5-point Bologna Score for gestational age, parity, nicotine habits, civil

status, BMI, and active labor status and at low risk on arrival. These variables were dichotomized as follows: gestational age $\leq 36 + 6$ versus $\geq 37 + 0$, primiparous versus multiparous, use versus no use of any tobacco product, married or cohabiting versus single, in active labor versus not in active labor, low risk versus high risk, age < 35 versus ≥ 35 years, and BMI ≤ 24 versus > 24 to allow calculation of odds ratios. A p value of ≤ 0.05 was considered to be statistically significant.

Results

Of the 36 participating maternity units, 35 returned their questionnaires. One hospital had a response rate of 19.6 percent and two hospitals returned the questionnaires without completing them. Results from these three units were excluded from the analysis. Background data were missing for 40 births; background data were available for the remaining 2,254 births.

Indicator A

Indicator A (the percentage of women with planned vaginal birth attended by a skilled attendant in labor) was fulfilled to 99.9 percent. Most of these women

Table 2. Comparisons of Available Background Data for Births with and without a Completed Questionnaire ($n = 1,878$)

Background Data	Completed ($n = 1,436$)	Not Completed ($n = 440$)	p (Fisher's Exact/ χ^2 Test)
Age (yr), mean (SD)	29.9 (5.1)	29.5 (5.2)	n.s.
Parity			
Nullipara (obstetric nullipara included)	702	200*	n.s.
Multipara	734	238	n.s.
Gestational week			
< 37	86	39*	0.037
37–42	1,291	381	n.s.
> 42	59	18	n.s.
Mode of delivery			
Vaginal birth	1,239	346	n.s.
Instrumental delivery	116	35	n.s.
Emergency cesarean section	81	59	< 0.001

*Two missing values.
n.s. = not significant.

Table 3. Number and Percentages of Births Scoring 1 Point for Each of the Items on the Bologna Score (Total Number of Births = 1,436)

Items in the Bologna Score	No. (%)
Presence of a companion	1,416 (98.7)
Use of a partogram	1,328 (92.6)
Skin-to-skin contact of mother and baby	1,323 (92.3)
Absence of labor augmentation, fundal pressure, or emergency cesarean section	787 (55.2)
Nonsupine position	497 (34.7)

Table 4. Odds Ratios for a 5-Point Bologna Score in Relation to Background Variables

Background Variables	OR	95% CI	p
Cohabiting	1.08	0.55–2.12	n.s.
Active labor	1.62	1.09–2.42	0.017
Low risk	1.43	1.02–2.00	0.038
No nicotine	1.31	0.84–2.07	n.s.
Body mass index < 24	1.48	1.14–1.94	0.004
Primipara	0.4	0.30–0.51	0.001
Gestational week	1.18	0.80–2.10	n.s.

n.s. = not significant.

were assisted by a midwife (72.4%) or by a student midwife who was supervised by a midwife (14.4%). Other attendants were physicians (12.7%) or medical students under supervision of a midwife (0.4%); one woman was assisted by her husband (0.1%).

Indicator B

Indicator B (i.e., mode of delivery) showed that induction of labor was planned for 8.6 percent ($n = 194$) of the births, and elective cesarean section was planned for 7.9 percent ($n = 179$), giving a total of 16.5 percent of births. Of the remaining 83.5 percent ($n = 1,881$) of women who planned for a vaginal birth, 5 gave birth before arrival at the hospital and were therefore excluded. Of the final 1,876 births, 1,436 (76.5%) had a complete Bologna Score.

Comparisons of background variables (age, parity, gestational week, and mode of delivery for birth) for those with ($n = 1,436$) or without ($n = 440$) a completed questionnaire are shown in Table 2. Two statistically significant differences were found among these groups. Significantly more births occurred before gestational week 37 ($p = 0.037$) and significantly more emergency cesarean sections ($p \leq 0.001$) were performed in the group without a completed questionnaire.

Indicator C

A full 5-point Bologna Score, suggesting evidence-based management for women with planned vaginal birth, was achieved for 22.7 percent ($n = 327$) of the births. The items included in the Bologna Score tool are shown in Table 3. The results showed that 3 of the 5 items were to a great extent given an affirmative answer: “presence of a companion,” “use of a partogram,” and “skin-to-skin contact between mother and baby.” On the other hand, “absence of labor augmentation, fundal pressure, and emergency cesarean section” and “nonsupine position for birth” were not affirmed to the same extent. The variable that was least often affirmed was nonsupine position for birth.

Birth with interventions (oxytocin augmentation, fundal pressure, and emergency cesarean section) occurred for 44.8 percent of the women. The most common intervention was labor augmentation using intravenous oxytocin ($n = 477$); the second most common intervention was fundal pressure ($n = 97$), followed by emergency cesarean section ($n = 83$). Of the 477 women who had oxytocin augmentation, slightly fewer than half (48.7%) had epidural anesthesia.

Of all the planned vaginal births, 936 (65.3%) were managed in a supine position. Of the supine births, 21.7 percent comprised 121 ventouse deliveries and 83 emergency cesarean sections. For the remaining 732 (78.3%), no explanation was recorded for the supine position. Nine infants (0.6% of the sample) had an Apgar score < 7 at 5 minutes after birth.

Odds Ratios for a 5-Point Bologna Score in Relation to Background Variables

The background variables that were associated with increased odds for a 5-point Bologna Score were BMI of 19 to 24, in active labor on admission and at low risk (Table 4). Primiparous women had decreased odds for a 5-point score. Other background variables were not significantly associated with the Bologna Score.

Background Variables and Variations among Individual Delivery Units

Of those women for whom a completed questionnaire was available and a vaginal birth was planned, most did not use nicotine (90.5%) and were married or cohabiting (96.4%). Slightly more than half (54.5%) had a BMI within normal range and 40.8 percent were overweight or obese. Most women (85.9%) were judged to be in active labor and at low obstetric risk (80.5%) on arrival at the maternity unit. The midwives reported that they considered birth to be normal for 1,177 (82%) of the women in their care. Of the births that were considered normal, 31 (2.6%) were by ventouse, 350 (30%) had labor augmented by oxytocin, and 263 (22.3%) had epidural anesthesia.

Figure 1 shows the percentage of births with a 5-point Bologna Score for the individual delivery units (range 0–53.1%). The hospitals with the highest

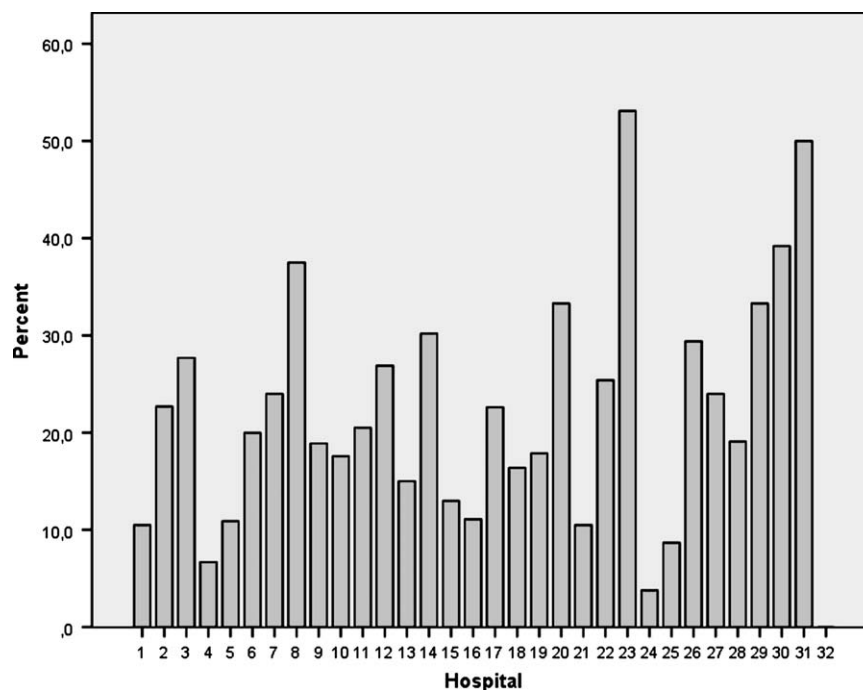


Fig. 1. Percentages of births at individual maternity units with a 5-point Bologna Score.

percentages of 5-point scores specialized in the care of low-risk births. An analysis of all low-risk births ($n = 1,155$), irrespective of specialization of the hospital, showed that the diversity in numbers of 5-point scores was persistent (0–54.5%). The mean Bologna Score was 3.73 (SD 0.9) for the whole cohort and 3.81 (SD 0.8) for those at low risk. Maternity units with an annual birth rate between 2,000 and 3,000 had a significantly increased number of 5-point scores when compared with all other units ($p = 0.007$).

Discussion

The results of this study suggest that Swedish intrapartum care follows the best available evidence for care in normal birth to only a limited extent. Although vaginal birth was planned for 83.5 percent of women and midwives considered 80.5 percent to be at low risk, only 22.7 percent of births attained a 5-point score for evidence-based management. This finding shows a large discrepancy between what an expert committee from the WHO (4) and Swedish midwives consider to be appropriate care in vaginal birth. The working group who developed the Bologna Score tool suggested the use of Apgar scores as a measure of infant well-being in relation to well-managed birth. In this study, only nine infants had an Apgar score of < 7 at 5 minutes, despite the low number of births conducted according to best evidence. It was considered that this number was too small to allow comparisons between low and high Apgar groups for how birth was managed. The large majority of the infants with high Apgar scores at 5 minutes is in line with Swedish national statistics (25).

Vaginal birth was planned for 83.5 percent of women and was achieved for most of them (84%). This result, which is in accordance with the WHO's estimation that 70 to 80 percent of births ought to be vaginal births (4), is encouraging, but questions remain about whether optimal care was given during these births. The results show that the use of the supine position was the variable that was largely responsible for loss of points on the Bologna Score. Studies have shown that nonsupine positions are preferred for avoidance of perineal trauma (26), and according to a Cochrane review, women should be offered the choice to give birth in whatever position they find comfortable (27). It is unclear in the present study whether the women or the midwives made the decision to adopt a supine position for birth. However, in an earlier study, women responded that they were not encouraged to avoid a supine position (28). If midwives abandon the use of supine positions, they may start to encourage women to birth in up-

right positions. Therefore, when new studies using the Bologna Score are conducted, it might save speculation if perineal and sphincter trauma are examined at the same time.

The intervention most used was augmentation of labor with oxytocin. Discussions are currently ongoing within Swedish maternity care about the use and misuse of oxytocin and the cascade of interventions that its use can incur (29). Although only 22.7 percent of the women with a planned vaginal birth had a 5-point Bologna Score, the midwives considered that 82 percent of the births were normal. One observation that emerged from this study was that midwives sometimes also considered ventouse deliveries as normal births and also considered oxytocin augmentation and epidural anesthesia as part of normal birth. The midwives seemed to have accepted the medical model as part of their role (7). Earlier studies have suggested that women do not mind interventions; they trust midwives to give them the best available care (28). Women place great trust in midwives, and they accept interventions if the midwife believes that interventions are necessary. This fact makes it ethically imperative that midwives base their decisions on the best possible available evidence.

The large variation in Bologna Scores among individual maternity units indicates that Swedish intrapartum care depends on attitudes, leadership, and specific beliefs and not on the uniqueness of each birthing woman or on scientific evidence. Comparisons among maternity units are a way of informing and stimulating public debate on health care quality and efficiency. National quality indicators can be used to stimulate and support local and regional efforts to improve health care services in terms of clinical quality and medical outcomes and patient experience and efficient use of economical resources.

The difficulties entailed in carrying out intrapartum studies have been described by Hundley V, and Cheyne H (30). Large national surveys are also susceptible to large dropout rates. This study experienced a large external dropout rate due to the fact that four hospitals with more than 4,000 births per year did not take part, and we estimate that approximately 40 percent of births were therefore not included during the 2-week period during which the material was collected. The internal dropout rate was relatively small, and we estimate an approximate loss of 23 percent of questionnaires. Some care must therefore be exercised when interpreting our results. It is possible that the acute nature of obstetric complications is responsible for the larger number of preterm births and emergency cesarean sections in the group without a completed questionnaire. Simply, the midwives were too stressed to remember to complete a questionnaire. It is not

surprising in an industrialized country such as Sweden that a skilled attendant cared for almost all women. For the Bologna Score to be valid for use in developing countries, it is necessary to include this variable.

Further research is required to clarify why women give birth in supine positions. It will be important in the future to introduce national and international quality indicators to allow open comparisons among maternity units. Since midwives considered birth to be normal even when interventions were used, it will be important for future investigation that women's experiences of birth are investigated to ascertain their views of normality. The results of this study point to the fact that it is necessary for Swedish midwives to discuss their professional stance.

Conclusions

The results suggest that in Sweden, birth is managed according to scientific evidence to a limited degree. Large differences among units also suggest that care in childbirth is based on attitudes rather than on scientific evidence. The Bologna Score tool was easy to use and gave a good picture of how care was given at the participating maternity units, and we suggest that the instrument is useful as a quality indicator for intrapartum care. We consider that validity of the instrument has been shown. It could be used to identify measures for improvement to facilitate a change from medical and technical care to a more evidence-based and holistic care.

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