

Early Post-Cesarean Rehabilitation in A Tertiary Hospital in Burkina Faso

SOME WCL ¹, KOMBOIGO BE ^{2,3*}, SIMPORE A ^{1,4}, SOME DA ^{2,3}, THIEBA B ^{1,4}, DAO B ²

¹ Yalgado Ouedraogo teaching hospital (YOTH), Ouagadougou, Burkina Faso.

² Higher Institute of Health Sciences of Nazi Boni University, 01 BP 1091, Bobo-Dioulasso, Burkina Faso.

³ Sourô Sanou University Hospital Center, Bobo-Dioulasso, Burkina Faso.

⁴ Health Science Training and Research Unit of Joseph Ki-Zerbo University.

***Corresponding Author:** KOMBOIGO BE, Higher Institute of Health Sciences of Nazi Boni University, 01 BP 1091, Bobo-Dioulasso, Burkina Faso.

Received date: May 12, 2023; **Accepted date:** June 16, 2023; **Published date:** August 22, 2023.

Citation: Some Wc, Komboigo Be, Simpoire A, Some Da, Thieba B, (2023) Early Post-Cesarean Rehabilitation in A Tertiary Hospital in Burkina Faso, 2021, *J. Obstetrics Gynecology and Reproductive Sciences*, 7(6) DOI:10.31579/2578-8965/166

Copyright: © 2023, KOMBOIGO BE. This is an open-access article distributed under the terms of The Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract:

Introduction: early post-caesarean rehabilitation could be an ideal alternative in terms of direct health savings for the parturient and indirect for the community.

Objective: Studying the effects of early rehabilitation after caesarean section in women at Yalgado Ouedraogo teaching hospital (YOTH)

Methodology: This was a cohort study comparing two groups of patients who underwent a scheduled caesarean section from 7th May to 4th September, 2020 in the obstetrics department of YOTH. Group 1 consisted of women benefiting from the early rehabilitation protocol (n=124) and group 2 consisted of non-rehabilitated women (n=124).

Results: The times of first getting up (p=0.01), walking (p<0.05), first drink (p=0.0001), removal of the urinary catheter (p<0.05), and urination (p<0.05) were significantly reduced in group 1. There was no statistically significant difference in postoperative pain. The mean time to first urination after removal of the urinary catheter was 18.8 ± 4.3 hours in the rehabilitated operated group versus 28 ± 10.5 hours in the non-rehabilitated group (p < 0.05). The first rise took place on average 7.2 ± 1.5 hours after the cesarean section in the rehabilitated group versus 8.1 ± 3.7 hours in the non-rehabilitated group (p=0.01). There was a significant reduction in length of stay (p < 0.05) and cost of treatment (p=0).

Conclusion: The early rehabilitation protocol after caesarean allows a significant improvement in terms of functional recovery, length of stay and cost of treatment.

Keywords: early; rehabilitation; caesarean section; yoth; burkina faso

Introduction

Any surgical procedure generates stress which can be responsible for profound modifications in the homeostasis of the human organism. Following this, comes convalescence, which is defined as a complex process specific to each patient [1].

The purpose of conventional perioperative care is to deal with the stress associated with the surgical act and to promote a smooth convalescence. The concept of "Fast track Surgery" or "enhanced recovery after surgery" which means "early, accelerated or improved rehabilitation" makes it possible to reduce the duration of hospitalization for patients while improving postoperative recovery, through a multidisciplinary approach. and

multimodality of the perioperative period [2]. This early rehabilitation is also applicable after cesarean section. Indeed, caesarean section is increasingly considered a non-major intervention since nowadays it is possible for patients to return to normal physical activity after this intervention within a short to medium period of time [3].

The use of maternity services by women has increased significantly since the introduction of free maternal and child care by the government of Burkina Faso in 2016 [4]. This could explain the increase in the cesarean rate observed in hospitals. But the duration of hospitalization in most of these hospitals can reach three days or more. The number of hospital beds being limited in these hospitals, there is inevitably a problem of availability of

beds. At the Yalgado Ouedraogo teaching hospital (YOTH), the occupancy rate of maternity beds was 120.5%, 114.2%, 116% respectively in 2016, 2017 and 2018 [5]. The overcrowding of hospital rooms leads some women to lie on the floor with negative consequences on the quality of care offered and an increase in the rate of morbidity and maternal and neonatal mortality. Early post-caesarean rehabilitation at the YOTH could therefore be an ideal alternative in terms of direct health savings for the parturient and indirect for the community. The aim of the work was to study the effects of early rehabilitation after caesarean section in women at the Yalgado Ouedraogo teaching hospital (YOTH).

Material and methods:

The study took place in the obstetrics department of the Yalgado Ouedraogo teaching hospital (YOTH). This was a cohort comparing two groups of patients who underwent a cesarean section between 7th May and 4th September, 2020. Group 1 had received the early postoperative rehabilitation protocol instituted during this study and group 2 the usual care protocol after caesarean section. We included in the study all the women who had undergone a planned caesarean section during which no pre- and intra-operative complication had occurred. We did not include women who underwent emergency caesarean section or those who presented a contraindication to one of the molecules of the postoperative management

protocol or those who had an ASA (American Society of Anesthesiologists) score higher than 2. We carried out an exhaustive sampling of all the women admitted for scheduled caesarean section and who met the study criteria. The choice of patients from the two groups was made randomly without a matching criterion. We collected 248 patients including 124 from group 1 and 124 from group 2. The data were collected by semi-structured direct individual interviews and by a documentary review using a questionnaire including the variables of the study. The judgment criteria related to the postoperative length of stay, functional recovery (motor, sensory and cognitive), the occurrence of postoperative adverse effects, the overall cost of treatment and the management of postoperative pain operative. The data were collected by direct semi-structured individual interviews and by a documentary review using a questionnaire including the variables of the study. The judgment criteria related to the postoperative length of stay, functional recovery (motor, sensory and cognitive), the occurrence of postoperative adverse effects, the overall cost of treatment and the management of postoperative pain operative. The data were collected by direct semi-structured individual interviews and by a documentary review using a questionnaire including the variables of the study. The judgment criteria related to the postoperative length of stay, functional recovery (motor, sensory and cognitive), the occurrence of postoperative adverse effects, the overall cost of treatment and the management of postoperative pain operative.

Consultation or a pre-an aesthetic visit where patients are informed of post operative care procedures.

The anesthesia protocol is as follows:

- Standard monitoring (oxygen saturation-cardiac frequency)
- Peripheral venous access with an 18G catheter, vascular pre-filling with 500 to 1000 milliliters (ml) of crystalloids.
- Antibiotic prophylaxis: based on 2 grams (g) of Ceftriaxone.
- Lumbar puncture in a seated position using a 25 gauge "pencil point" spinal anesthesia needle.
- Intrathecal injection of a mixture based on 7.5 micrograms (mg) to 10 micrograms (mg) of isobaric bupivacaine 0.5%, and 12.5 of fentanyl or 2.5 micrograms (mg) of sedentary 1 and morphine 100 micrograms (mg) systematically.
- Prevention of aorto-caval compression by placing the patient in a slight left lateral slope.
- Oxygenation using nasal prongs at an average flow rate of 1.5 liters per minute.
- Placement of an indwelling urinary catheter.
- Prevention of postoperative nausea and vomiting with 4 micrograms (mg) of ondansetron combined with 4 micrograms (mg) of dexamethasone.
- Continuous monitoring of vital parameters (blood pressure- cardiac frequency -Pulse). Administration of oxytocin 10 International Units (IU) by direct intravenous (IVD) fetal extraction and followed by a continuous infusion of 10 IU of oxytocin per bag of infused solute.
- Postoperative analgesia with 1 g of paracetamol plus 20 micrograms (mg) of nefopam ± 100 mg of diclofenac depending on whether there is a contraindication.

Box 1: Joint care administered to the two study

- Hydro-electrolyte intake by alternating administration of RL and SGI every 4 hours.
- Infusion of 5 to 10 UI of oxytocin, according to the instructions of the operator, per 500ml of crystalloid solution administered every 8 hours.
- Continuation of postoperative analgesia with the combination of injectable paracetamol 1g plus nefopam 1 ampoule every 6 hours plus or less a non-steroidal anti-inflammatory in the form of a suppository (diclofenac 100 mg in this case).
- Prevention of venous thromboembolic disease with injectable Enoxaparin 0.4ml every 24 hours subcutaneously from the 8th postoperative hour and for 4 to 7 days.
- Continuation of injectable antibiotic therapy until resumption of intestinal transit.
- Removal of the indwelling catheter on the first postoperative day.
- Oral relay of antibiotics and painkillers.
- Authorization to leave the maternity ward from the third day in the absence of complications.

Box 2: Usual post-operative care administered to group 2 (usual department protocol)

- A fluid intake in the form of an infusion of 500 ml of crystalloids (SGI, RL) over 5 hours (i.e., 2.5 liters per day on average).
- Infusion of oxytocin 10 IU in 500 ml of crystalloid solution over 6 hours
- Post-operative analgesia by administration of injectable paracetamol 1g and nefopam 20mg immediately and systematically after the intervention until the 6th hour. Diclofenac suppository was combined every 12 hours for 48 hours. Then the relay was taken with oral paracetamol, 1g every 6 hours if the woman suffered from pain
- Obturation of the peripheral venous line at the 6th hour and 24th hour ablation
- The authorization of the first drink as soon as motor recovery appears when locoregional anesthesia (LRA) had been performed and at the 4th postoperative time if general anesthesia (GA) was performed
- The resumption of a semi-liquid diet at the 6th post operative time
- Removal of the indwelling bladder catheter as soon as motor skills are recovered and at the 6th hour after caesarean section if general anesthesia was performed.
- The first lift was authorized as soon as possible on the 6th hour and ambulation if disappearance of sensorimotor block in case of ALR or Glasgow score equal to 15 in case of GA.

Box 3: Application of early postoperative rehabilitation to group 1

Microsoft Word and Excel 2019 computer software were used for word processing, tables, graphs and Epi info version 7.2.2 for data analysis. The central tendencies (mean) and dispersion (standard deviation, minimum, maximum, quantiles) parameters were calculated for the quantitative variables. For qualitative variables proportions were used. Tests (Chi², Fischer's and Student's exact test) were used to assess the association between the different variables at the 5% significance level. For ethical considerations, we obtained authorization from the national ethics committee

in Burkina Faso under deliberation number 68 of 22th April, 2020. Also, patients were asked to give their free and informed consent to participate in the study

Results

Socio-demographic characteristics

The average age of the rehabilitated patients was 28.7 ± 6.7 years versus 27.6 ± 6.5 years for the non-rehabilitated patients ($p = 0.15$). Table 1 includes the distribution of patients according to Socio-demographic characteristics.

Socio-demographic data	Rehabilitated		No rehabilitated	
	n	%	n	%
Age (years)				
< 19	4	3.2	6	4.8
19-24	30	24.2	34	27.4
25-29	31	25	27	21.8
30-34	28	22.6	33	26.6
35-39	19	15.3	18	14.5
40-44	11	8.9	5	4.1
> 44	1	0.8	1	0.8
Total	124	100	124	100
Main occupation				
Housewives	68	54.8	61	49.2
Officials	24	19.4	12	9.7
Informal sector	24	19.4	31	25
Pupil/student	8	6.4	20	16.1
Total	124	100	124	100
Education level				
No schooling	40	32.3	51	41.1
Primary	19	15.3	16	12.9
Secondary	48	38.7	50	40.3
Superior	17	13.7	7	5.7
Total	124	100	124	100
Marital status				
Bride	105	84.7	102	82.3
Concubinage	13	10.5	19	15.3
Bachelor	6	4.8	3	2.4
Total	124	100	124	100

Table 1: Distribution of patients according to Socio-Demographic characteristics

Rehabilitation data

The average time taken to absorb the first drink was 6.9 hours ± 1.4 hours in the rehabilitated group versus 8.3 hours ± 3.7 hours in the non-rehabilitated group (p= 0.0001). The average time for removal of the urinary catheter was

7.7 ± 2.1 hours in the operated group, rehabilitated versus 10.5 hours ± 4.9 in that of the non-rehabilitated (p<0.05). The mean time to ablation of the peripheral venous line was 24.3 hours ± 2.4 in the rehabilitated group versus 22.3 hours ± 5.6 in the non-rehabilitated group (p=0.0003). Table 2 includes the distribution of patients according to data from early rehabilitation.

Rehabilitation data	Rehabilitated		No rehabilitated	
Absorption the 1 st drink in hours	n	%	n	%
[0-6[	12	9.7	22	17.8
[6-12[	112	90.3	84	67.7
[12-18[	0	0	15	12.1
[18-24[	0	0	2	1.6
≥24	0	0	1	0.8
Total	124	100	124	100
Bladder catheter removal time in hours				
[0-6[	18	14.5	9	7.3
[6-12[	103	83.1	73	58.8
[12-18[	3	2.4	29	23.4
[18-24[	0	0	10	8.1
[24-48[	0	0	3	2.4
Total	124	100	124	100
Vein line ablation time in hours				
[6-12[	0	0	5	4
[12-18[	1	0.8	45	36.4
[18-24[	35	28.2	37	29.8
[24-48[	88	71	37	29.8
Total	124	100	124	100

Table 2: Distribution of patients according to data on early rehabilitation

Functional recovery

The mean time to first urination after removal of the urinary catheter was 18.8 ± 4.3 hours in the rehabilitated operated group versus 28 ± 10.5 hours

in the non-rehabilitated group (p < 0.05). Figure 1 illustrates the distribution of patients according to the time to occurrence of the first spontaneous micturition after removal of the urinary catheter.

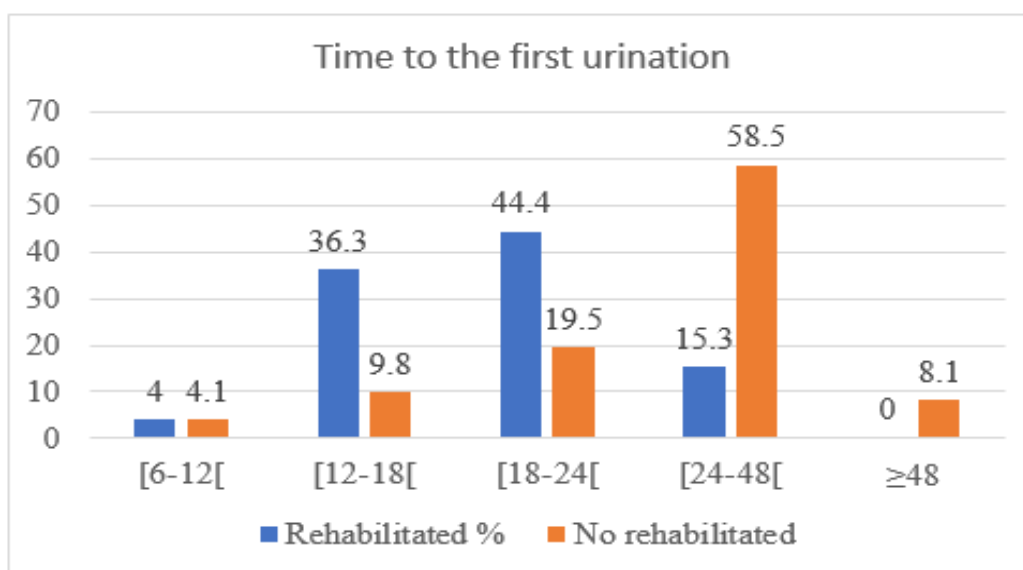


Figure 1: Distribution of rehabilitated patients (n1=124) and not rehabilitated(n2=124) according to the delay of the first micturition after removal of the urinary catheter.

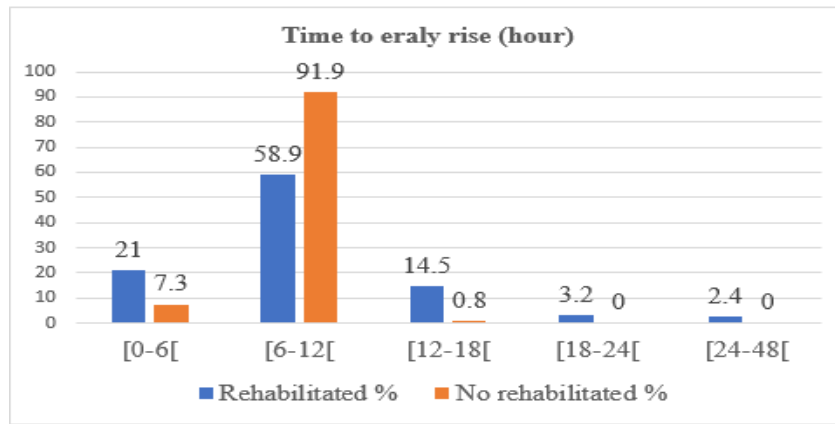


Figure 2: Distribution of rehabilitated patients (n1=124) and not rehabilitated (n2=124) according to the time to first get up after the caesarean section.

The first rise took place on average 7.2 ± 1.5 hours after the cesarean in the rehabilitated group versus 8.1 ± 3.7 hours in the non-rehabilitated group ($p=0.01$). Figure 2 illustrate the distribution of patients according to the time to first get up after caesarean section.

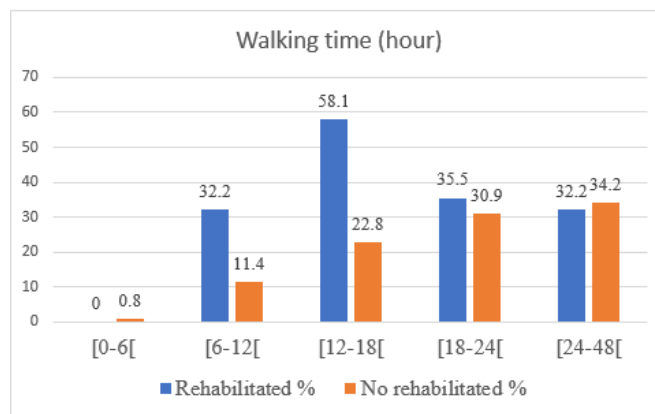


Figure 3: Distribution of rehabilitated (n=124) and non-rehabilitated (n=124) patients according to ambulation time after caesarean section.

The average time to return to walking was 16.4 ± 3.6 hours in the rehabilitated group vs. 20.9 ± 8.5 hours in the non-rehabilitated group ($p < 0.05$). Figure 3 illustrates the distribution of patients by group according to the time to start of ambulation after caesarean section.

Patient effort		Visual analog scale average in hours*					
		12 th hour		24 th hour		48 th hour	
Rest	Rehabilitated	1.6±0.3	p=0.14	1.2±0.4	p=0.000		
	No rehabilitated	1.7±0.7		1.5±0.5		1.4±0.5	
At the mobilization	Rehabilitated	2.1±0.5	> 0.99	1.5±.5	p=0.004	1.4±0.1	p=0.02
	No rehabilitated	2.1±0.8		1.7±0.6		1.5±0.5	

Table 3: Distribution of patients according to the mean of the visual analogue scales according to the effort of the patient at the 12th, 24th and 48th hour.

Postoperative pain

In Table 3 are presented the means of the visual analog scales at rest and during mobilization at the 12th, 24th and 48th hour.

	Rehabilitated	No rehabilitated	P-value
Side effects	n (%)	n (%)	
Discomfort when first getting up	30(24.2)	73 (58.8)	< 0.05
Nausea postoperative vomiting	20(16.1)	18 (14.5)	0.7
Infectious complications	2(1.7)	0 (0)	0.3

Table 4: Distribution of rehabilitated and non-rehabilitated patients according to side effects

Scalable data

The usual protocol was significantly associated with discomfort on first rising ($p < 0.05$). Table 4 presents the adverse effects occurring in the postoperative period according to the treatment groups. The average duration of hospitalization after the cesarean section was 2.9 days \pm 0.2 in the rehabilitated group versus 3.5 days \pm 0.9 days in the non-rehabilitated group ($p < 0.05$). The average cost of care for patients in the early rehabilitation group was 89516.1 CFA money \pm 9699.1 vs 97612.9 CFA money \pm 29070.1 in the non-rehabilitated group (i.e., respectively 179 USD \pm 19.4 versus 195.23 USD \pm 58.4). The difference was statistically significant with $p = 0.003$.

Discussion:

Early rehabilitation data

The average time taken to absorb the first drink was 6.9 hours \pm 1.4 in the group of rehabilitated patients versus 8.3 hours \pm 3.7 in the group of non-rehabilitated women. The difference was statistically significant with p value equal to 0.0001. Huang and al. in 2016, reported that early oral rehydration would allow rapid resumption of intestinal transit and early ambulation. It would also reduce the risk of infection, the delay in breast-feeding and the duration of hospitalization [6]. Our results contrast with those of Mangesi and al who, in 2002, found no significant difference in the resumption of intestinal transit between early and late resumption of oral feeding [7].

In our study, on average, early rehabilitation reduced the time to removal of the urinary catheter by 3 hours. Indeed, the ablation of the probe was made within 24 hours after caesarean section in 95.2% of patients benefiting from early rehabilitation. This rate is close to that of Laronch and al in France which was 93% [8]. Ghoreishi and al found in 2003, in a study of indwelling urinary catheters in cesarean delivery, that the use of an indwelling urinary catheter is an unnecessary part of the cesarean delivery process. In addition, urinary retention was very rare [9]. Nevertheless, Pavlin and al found that it would be important to combine this strategy with a monitoring protocol for voiding [10].

The mean time to ablation of the peripheral venous line was 24.3 hours \pm 2.4 in the group of rehabilitated women versus 22.3 hours \pm 5.6 in the non-rehabilitated group ($p = 0.0003$). The venous line was removed in all patients within 24 hours after surgery. This rate is similar to that found by Laronche and al in Paris in 2017, which was 98% [8]. However, it is superior to that found by Jacques and al in France which was 49% [11]. A practice survey of maternity wards in the Provence-Alpes-Côte d'Azur and Île-de-France regions in 2013 revealed that the venous line was maintained for 24 hours after the procedure in 70% of patients who received planned caesarean section [12]. Although maintaining the venous line is a brake on regaining autonomy, the need to administer oxytocics and intravenous analgesics would lead practitioners to keep the venous line for 24 hours. In our study, the absence of complications in the immediate postpartum in early rehabilitated patients justified the removal of the venous line within 24 hours after cesarean section.

Functional recovery

Early rehabilitation significantly reduced first rise time by nearly one hour (7.2 hours vs. 8.1). The difference was significant with $p = 0.01$. Mazard and al in France in 2015 found an average delay close to 9 hours \pm 4.2 [13]. Randriambololona in Antananarivo in 2018 was higher than ours (16.4 hours) [14]. Getting up early is a fundamental point of early rehabilitation. It

allows patient autonomy and prevention of thromboembolic risk. The results of our study are much better since the first sunrise took place at the 12th hour in 99.2% in rehabilitated women compared to 78.9% in non-rehabilitated ones ($p = 0.05$). In fact, James and al in France had only 53.3% of women having their first birth the day after the cesarean section [11].

The mean walking time was 16.4 \pm 3.6 hours in the group of rehabilitated women vs. 20.9 \pm 8.5 hours in the group of non-rehabilitated ones ($p < 0.05$).

Our study showed an increase in the rate of early ambulation in patients who had benefited from early rehabilitation. In fact, all the patients who had benefited from early rehabilitation had ambulated within 24 hours after the cesarean compared to 68.5% in patients who had benefited from the usual protocol. These figures corroborate those found by Lee and al who reported a significant increase ($p = 0.001$) in early ambulation from 33 to 51% after the implementation of the early rehabilitation protocol [15].

Postoperative pain

This study revealed to us that at the 12th hour there was no statistically significant difference in the pain experienced by the two groups of patients, both at rest ($p = 0.14$) and during mobilization ($p > 0.99$). This could be explained by the fact that the two groups of patients benefited from the same analgesia made of paracetamol 1gram associated with nefopam 20 micrograms until the 6th postoperative time.

In patients undergoing early rehabilitation at 24th hour the early rehabilitation protocol significantly reduced postoperative pain by 0.3 at rest ($p = 0.0000$) and by 0.2 at mobilization ($p = 0.004$). Similarly, at the 48th hour, there was a significant decrease in pain intensity of 0.3 at rest ($p = 0.00002$) and 0.1 on mobilization ($p = 0.02$). This difference could be explained by the fact that the diclofenac suppository had been systematically combined every 12 hours for 48 hours in the early rehabilitation protocol, which was not the case for the usual protocol.

In the literature, several authors have conducted comparative studies of the level of pain felt between two groups of patients benefiting from early postoperative rehabilitation and not. Elgohary and al in 2017 compared the intensity of pain between a group of patients benefiting from early rehabilitation and another from conventional rehabilitation as part of scheduled colorectal surgery and found a statistically significant difference ($p < 0.001$) (16). As for Meyer and al. in 2018, they found no statistically significant difference for the same type of study conducted on two groups of patients who had undergone obstetric surgery ($P = 0.80$) [17]

Scalable data

Nausea/vomiting was at the forefront with 16.1% in the group of rehabilitated women and 14.5% in the group of those not rehabilitated. There was no statistically significant difference between the two groups with $p = 0.7$.

Our results are higher than the 6.6 and 8.7 found by Moris B and al in 2019 in Uganda respectively in the rehabilitated and non-rehabilitated groups [18]. On the other hand, in his series, Randriambololona in 2018 at the University Hospital of Befelatanana reported a higher rate with a percentage of nausea/vomiting complications of 21.43% [14]. As for infectious complications, he found no significant difference between the two groups $p = 0.3$. During the first lift, 24.2% of patients rehabilitated in our study compared to 58.8% of those not rehabilitated had presented with discomfort. The difference was statistically significant between the two groups with $p < 0.05$ Moris B and al also found a statistically significant difference

between the groups of rehabilitated (6.6%) and non-rehabilitated (30.4%) patients [18].

The patients who had benefited from the early rehabilitation protocol were authorized to leave the maternity ward earlier than the other patients (2.9 days versus 3.5 days, $p < 0.05$). The rehabilitation protocol had significantly ($p < 0.05$) reduced the duration of hospitalization by an average of 12 hours. This reduction in hospital stay is similar to that reported by Rousseau et al in France in 2017 which was 10 hours [19]. The main fear of early discharge remains the risk of rehospitalization. But Wrench and al in England found that patients who were discharged on the first day after caesarean section using an early rehabilitation protocol were no more rehospitalized than those discharged on the second day after caesarean section [20]. Of course, the early discharge of patients implies a good city–hospital relay. A discharge on the third day after the caesarean section requires that the medical team has ensured that returning home is possible on the basis of the acquisition of various prerequisites by the mother (mother-child relationship, 18

breastfeeding, newborn care). These prerequisites are achieved more quickly with the application of early rehabilitation since the mother can get up on her own, without being bothered by a urinary catheter or an infusion. As a result, the mother can be autonomous with her child before the 12th post cesarean hour. In our study, 99.2% of patients benefiting from early rehabilitation had made their first rise before the 12th hour, which would explain this reduction in hospital stay.

The average cost of care for patients in the early rehabilitation group was 89516.1 CFA money \pm 9699.1 versus 97612.9 CFA money \pm 29070.1 (i.e. respectively 179 USD \pm 19.4 vs 195.23 USD \pm 58, 14) in the group of unrehabilitated women ($p = 0.003$). The earlier authorization for patients to leave the hospital, made possible thanks to the application of this protocol, seems to have contributed to significant savings for the health system. Orji and al in Nigeria found that women in the rehabilitated group required less intravenous fluid than those in the non-rehabilitated group [21], which may explain the lower cost of treatment. Also our results are similar to those of Fay and al in the United States of America in 2019 who found that total postoperative direct costs decreased [22].

Conclusion

This study revealed to us that patients who benefit from early rehabilitation had faster empowerment. This empowerment was favored by adequate management of postoperative pain, faster removal of medical devices, early oral nutrition and early mobilization. The study also allowed us to observe a reduction in the duration of hospitalization and a significant drop in the cost of caesarean section management. Maternal satisfaction and the mother-child relationship were not addressed in the study. Further studies integrating these aspects should make it possible to refine the benefits of early rehabilitation in obstetrics at the Yalgado Ouedraogo teaching hospital or even beyond.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the authorization of the ethics committee. Written informed consent to

participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

SWCL and KBE prepared the manuscript, SWCL collected the data, SA analyzed the data, SDA, BT and DB provided a useful review of this manuscript. All authors contributed to the article and approved the submitted version.

Acknowledgments

The authors would like to thank all patients for their consent obtained. The authors also thank all the staff who contributed to the care of the patients. They would also like to thank Meighan Mary for her contributions to the writing in English.

Conflict of interest

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

1. Slim K. (2018). Improved rehabilitation after surgery: Understanding it and implementing it, Paris. Elsevier Health Sciences, 06/130p.
2. Kehlet H. (1997). Multimodal approach to control postoperative pathophysiology and rehabilitation. *Br J Anesth.* 78(5):606-717.
3. Wyniecki A, Tacsy M, Benhamou D. (2010). Caesarean section: an intervention which should now benefit from the concept of early postoperative rehabilitation. *The Anesthesia Resuscitation Practitioner.* 14(6):375-382.
4. Burkina Faso, (2017). Ministry of Health of Burkina Faso, General Directorate of Studies and Sector Statistics (DGSS). Statistical Yearbook 2018, 386p.
5. Burkina Faso, (2019). Ministry of Health, CHUYO Public Health Department. CHUYO 2018 Statistical Yearbook; 289p.
6. Huang H, Wang H, He M. (2016). Early oral feeding compared with delayed oral feeding after cesarean section: a meta-analysis. *J Matern Fetal Neonatal Med.* 29(3):423-429.
7. Mangesi L, Hofmeyr GJ. (2002). Early compared with delayed oral fluids and food after caesarean section. *Cochrane Database Syst Rev.* (3).
8. Laronche A, Popescu L, Benhamou D. (2017). An enhanced recovery program after caesarean delivery increases maternal satisfaction and improves maternal-neonatal bonding: A case control study. *European Journal of Obstetrics & Gynecology and Reproductive Biology.* 212-216.
9. Ghoreishi J. (2003). Indwelling urinary catheters in cesarean delivery. *Int J Gynaecol Obstet.* 83(3):267-270.
10. Pavlin DJ, Pavlin EG, Gunn HC, Taraday JK, Koerschgen ME. (1999). Voiding in patients managed with or without ultrasound monitoring of bladder volume after outpatient surgery. *Anesthesia and Analgesia.* 89(1):90-97.
11. Jacques V, Vial F, Lerintu M, Thilly N, McNelis U, et al. (2013). Perioperative rehabilitation of uncomplicated scheduled caesareans in France: national practice survey. *French Annals of Anesthesia and Resuscitation.* 32(3): 142-148.

12. Wyniecki A, Raucoules-Aimé M, de Montblanc J, Benhamou D. (2013). Early rehabilitation after planned caesarean section: practice survey of maternity hospitals in the Provence - Alpes - Côte d'Azur and Île-de-France regions. *French Annals of Anesthesia and Resuscitation*. 32(3):149-156.
13. Mazard T, Hentzen J, Ferlay L, Cattenoz M, Lieutaud T. (2015). Early prophylactic post-caesarean rehabilitation: survey of practice in a level 2B maternity hospital. *Anesthesia & Resuscitation*. 1: A185-186.
14. Randriambololona S. Early postoperative rehabilitation after a planned caesarean section at the university hospital of gynecology and obstetrics Befelatanana TH MED UNIVERSITE D'ANTANANARIVO 2018, 106p 35-46.
15. Hedderson M, Lee D, Hunt E, Lee K, Xu F, et al. (2019). Enhanced Recovery After Surgery to Change Process Measures and Reduce Opioid Use After Cesarean Delivery: A Quality Improvement Initiative. *Obstet Gynecol*. 134(3):511-519.
16. Elgohary H, Baiuomy M, Mohamed A, Hamed M, Mosaad A. (2017). Comparative study between enhanced recovery after surgery and conventional perioperative care in elective colorectal surgery. *Egyptian Journal of Surgery* 36:137-144.
17. Meyer LA, Lasala J, Iniesta MD, Nick AM, Munsell MF, et al. (2018). Effect of an Enhanced Recovery after Surgery Program on Opioid Use and Patient-Reported Outcomes. *Obstet Gynecol* 2018;132(2):281-290.
18. Moris Baluku, Francis Bajunirwe, Joseph Ngonzi, Joseph Kiwanuka, Stephen Ttendo. (2020). A Randomized Controlled Trial of Enhanced Recovery After Surgery Versus Standard of Care Recovery for Emergency Cesarean Deliveries at Mbarara Hospital, Uganda. *Global Health*. 130(3):769-776.
19. Rousseau A, Sadoun M, Aimé I, Leguen M, Carbonnel M, et al. (2017). Comparative study on improved post-caesarean rehabilitation: what benefits, what risks? *Gynecology Obstetrics Fertility & Senology*. 45(7-8):387-392.
20. Wrench IJ, Allison A, Galimberti A, Radley S, Wilson MJ. (2015). Introduction of enhanced recovery for elective caesarean section enabling next day discharge: a tertiary center experience. *Int J Obstet Anesth*. 24(2):124-130.
21. Orji EO, Olabode TO, Kuti O, Ogunniyi SO. (2009). A randomized controlled trial of early initiation of oral feeding after caesarean section. *J Matern Fetal Neonatal Med*. 22(1): 65-71.
22. Savitsky, MD; Elizabeth B. Mills, MHA; JoAnn L. Slater, MN, RNC; Laurent A. Bollag, MD. Emily E. Fay, MD; et.al (2019). An enhanced recovery after surgery pathway for cesarean delivery decreases hospital stay and cost. *American Journal of Obstetrics & Gynecology* 221(4), 349.e1-349.e9.



This work is licensed under Creative Commons Attribution 4.0 License

To Submit Your Article, Click Here:

[Submit Manuscript](#)

DOI:10.31579/2578-8965/166

Ready to submit your research? Choose Auctores and benefit from:

- fast, convenient online submission
- rigorous peer review by experienced research in your field
- rapid publication on acceptance
- authors retain copyrights
- unique DOI for all articles
- immediate, unrestricted online access

At Auctores, research is always in progress.

Learn more <https://www.auctoresonline.org/journals/obstetrics-gynecology-and-reproductive-sciences>