Exercises are an important part of daily life for many women. According to Davidson et al., postpartum exercises (PPEs) are regarded as basic therapy, which may improve the health of puerperas. Body image is a great concern for puerperas. However, most puerperas never worry about the exercises following parturition and their benefit. This suggests limited knowledge and awareness regarding PPE that might result in backache, uterine subinvolution, urinary incontinence and flabby abdominal muscles. The study findings by Gaffield et al. indicated that puerperas have limited information with regard to the importance and benefits of PPEs. Sellers asserts that physiological changes such as the weakening of the abdominal and pelvic floor muscles, stiffness, and swelling of tissues caused by trauma during delivery inhibit the performance of PPEs, which are necessary to bring the stretched abdominal and pelvic muscles back to normal. A study by Ashrafinia et al. showed that PPEs help to strengthen pelvic and abdominal muscles, help in controlling haemorrhage and ensure a speedy uterine involution and recovery to the non-pregnant weight and physique. Davies et al. further indicated that puerperas should be engaged in PPE to reduce postpartum complications such as postpartum haemorrhage and/or puerperal sepsis. Fine et al. recommend that, in the absence of either obstetric or medical complications, puerperas should perform moderate exercises to maintain cardiopulmonary functions, muscular fitness and so that the internal structures could return to the pregravid state.

Methods

Research design

A quantitative, non-experimental and descriptive research design was employed in this study. This design enabled the researchers to study a selected sub-group of the population and to extrapolate the findings to the entire population in the tertiary hospital of Capricorn District. Measurements focused on specific variables, namely age, parity, knowledge and PPE, that were quantified through rating scale and frequency count. The study hypothesis was that young and educated puerperas had knowledge regarding PPE.

Population and sampling

The population was puerperas in a postnatal unit of a tertiary hospital in Capricorn District, Limpopo Province, South Africa (SA). Probability random sampling was used to ensure that all puerperas had an equal opportunity to be selected. The sample study consisted of 50 puerperas who completed the questionnaire in the postnatal unit. Puerperas were assembled in one cubicle and small papers with numbers or without numbers were placed in a box where each respondent picked a paper. Those who picked papers with numbers were included in the study and those without numbers were excluded from the study.

Data collection

Questionnaires with closed-ended questions were used as a method of data collection. Puerperas were assembled in the hospital cubicle and briefed about the self-administered questionnaires with fixed alternative questions. Fifty puerperas completed the questionnaires, which were designed to collect demographic data (section A) as well as data on the mothers’ knowledge of PPE. Data collection took 5 days.

Ethical considerations

Permission to conduct the study was requested from the Medunsa Research Ethics Committee (MREC) and from the Limpopo Department of Health and Social Development. Informed consent was obtained from all puerperas. The study was conducted in accordance with the Declaration of Helsinki. The study was approved by the National Research Ethics Committee.

Results

Our data revealed that 66% of puerperas participating in the study lacked knowledge regarding PPE, whereas 72% of puerperas were not exercising due to perineal pains, discomfort, exhaustion and a lack of educational programmes at clinics and hospitals. The study showed that there was a high rate of ignorance among puerperas regarding the importance of PPE.
was obtained from all puerperas after explaining the goals of the investigation, as well as the possible advantages and disadvantages of participating. Participation to the study was voluntary. Each respondent signed the consent forms after the researchers had explained the purpose of the study based on the research design in their own language. Puerperas were assured of confidentiality. A number was allocated to each respondent to ensure anonymity and confidentiality.

Validity and reliability
Midwifery experts and literature reviewing ensured content validity. Pretesting of the questionnaire contributed towards reliability of the data collection instrument, measured in terms of asking about things the puerperas were likely to be able to answer and clarity of the questions.

Results
Puerperas aged 17 - 19 years had the highest lack of knowledge regarding PPE. This supported the hypothesis from the researchers. Only 2 (4%) had knowledge about PPE. There were no differences in knowledge among puerperas between 20 and 22 years old. Fifty percent of the puerperas had knowledge regarding PPE, while the other half had no knowledge regarding PPE. Nine (18%) puerperas between 23 and 25 years old, had no knowledge, while only 7 (14%) had knowledge with regard to PPE. Only 1 (2%) of the puerperas, who was between 26 and 28 years old, had knowledge with regard to PPE, while 9 (18%) puerperas had no knowledge about puerperal exercises (Fig. 1).

Nine (18%) puerperas who were learners in grade 10 had no knowledge about PPE and only 1 (2%) puerpera in grade 11 had no knowledge of PPE. Five (10%) puerperas who were learners in grade 11 had knowledge of PPE. Fifteen (30%) puerperas in grade 12 lacked knowledge about PPE and only 5 (10%) had knowledge about PPE. Nine (18%) post-grade 12 puerperas had no knowledge while only 6 (12%) had knowledge about PPE (Fig. 2).

Nineteen (38%) puerperas who were para 1 had no knowledge regarding PPE. Fifteen (30%) puerperas who were para 2 had knowledge, while 8 (16%) had no knowledge regarding PPE. Seven (14%) puerperas who were para 3 had no knowledge and only 1 (1%) had knowledge regarding PPE (Fig. 3).

Twenty-one (42%) puerperas who had normal vaginal deliveries had no knowledge and only 4 (8%) puerperas had knowledge regarding PPE. Eleven (22%) puerperas who delivered by caesarean section (C/S) had knowledge, whereas three who delivered by C/S had no knowledge regarding PPE. Five (10%) puerperas who delivered by vacuum extraction had no knowledge, and only one

Fig. 1. Puerperas’ knowledge regarding PPE in relation to their age group.

Fig. 2. Puerperas’ knowledge regarding PPE in relation to their level of education.

Fig. 3. Puerperas’ knowledge regarding PPE in relation to their parity.

Fig. 4. Puerperas’ knowledge regarding PPE in relation to the type of delivery.
(2%) had knowledge regarding PPE. All 5 (10%) puerperas who delivered by forceps had no knowledge regarding PPE (Fig. 4).

**Discussion**

The results of the study indicated that 18 (36%) puerperas from the sample were not exercising due to perineal pains and discomfort experienced following labour and delivery. Table 1 recommends the types of exercises and also contains information on various exercises to improve puerperas knowledge regarding PPE. Downs et al.\[2\] hold that puerperas fail to initiate PPE because of exhaustion, perineal pains and discomfort that result from a sutured perineum. The study revealed that 34 (68%) puerperas lacked knowledge regarding PPE and there were no educational programmes offered to them either at the clinic level during puerperal care or at the hospital after delivery. However, 4 (8%) of the puerperas engaged actively in PPE.

The findings also indicated that puerperas were unable to understand the significance of exercising after delivery. Twenty (40%) puerperas reported that breastfeeding could return their bodies to the pregravid state. Only 11 (22%) puerperas had knowledge that through PPE, their bodies could return to the pregravid state. Nineteen (38%) puerperas reported that eating a normal balanced diet could return their bodies to the non-gravid state. Only 3 (6%) puerperas reported that other methods such as the tying of the abdomen could return their bodies to the non-gravid state.

**Table 1. Educational programme for PPE**

<table>
<thead>
<tr>
<th>Day</th>
<th>Type of exercise</th>
<th>Importance</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pelvic floor (Kegels)</td>
<td>Strengthen the muscles of the pelvic floor</td>
<td>Squeeze/tighten the anal sphincter for 3 seconds, relax the muscle for 3 seconds, and squeeze again. Begin with 10 3-second squeezes, thrice a day and increase gradually. Work up to 50 - 100 Kegels per day.</td>
</tr>
<tr>
<td></td>
<td>Abdominal breathing</td>
<td>Increase the tonicity of the deep transverse muscles</td>
<td>Lying supine, inhale deeply using abdominal muscles to expand the abdomen. Exhale slowly through pursed lips while tightening the abdominal muscles. Repeat 2 - 3 times.</td>
</tr>
<tr>
<td></td>
<td>Abdominal tightening</td>
<td>Strength abdominal muscles</td>
<td>Lie on back with knees bent. Tighten abdominal and buttock muscles and allow pelvis to tilt upwards.</td>
</tr>
<tr>
<td>2</td>
<td>Ankle/foot circulation</td>
<td>Enhance circulation, reduce oedema and prevent deep-vein thrombosis</td>
<td>Do ankle circles clockwise and anti-clockwise in different positions, such as sitting or lying down, etc. Repeat circular pattern 3 - 5 times daily.</td>
</tr>
<tr>
<td></td>
<td>Leg sliding</td>
<td>Increase circulation in legs</td>
<td>Lie on back with knees bent. Do the pelvic tilt to keep back flat while sliding one heel up and down the bed.</td>
</tr>
<tr>
<td></td>
<td>Arm and upper back stretch</td>
<td>Relieve backache and strengthen the ligaments</td>
<td>Raise arms over head with elbows straightened and palms facing one another, and hold position for 5 - 10 seconds. Lower arms out to the side, palms facing downward, while maintaining a straight back.</td>
</tr>
<tr>
<td>3 - 7</td>
<td>Abdominal strengthening</td>
<td>Strengthen the abdominal muscles</td>
<td>Lie on back with knees bent and feet flat on the floor. Slowly move chin to chest and raise the head and shoulders until the neck is 15 - 20 cm off the floor, while one arm is stretched out in front of the body.</td>
</tr>
<tr>
<td></td>
<td>Straight curl-ups</td>
<td>Strengthen the abdominal muscles</td>
<td>Lie on back with knees bent. Breathe in slowly through nose. Tuck chin in and raise head while hands are pointed toward the knees. Exhale and lift shoulders off the floor. Hold the position for 5 seconds. Inhale and slowly lower body to the count of five.</td>
</tr>
<tr>
<td></td>
<td>Sit-ups</td>
<td>Strengthen the abdominal muscles</td>
<td>Elevate head with a pillow and bend knees. Tuck chin in, exhale and reach towards the knees. Hold the position for 5 seconds and inhale as you release. Repeat 3 - 5 times.</td>
</tr>
<tr>
<td></td>
<td>Aerobic activity</td>
<td>Promote cardiorespiratory and muscular fitness</td>
<td>Repeat all the above exercises and start to initiate gentle aerobic activities, such as walking, as soon as you are able to tolerate them, within ~1 week, where possible. Vigorous aerobic activity can usually be resumed after your postpartum check-up.</td>
</tr>
</tbody>
</table>
Recommendations

The findings of the study suggest that the initiation and implementation of health education programmes on PPE in postnatal units would improve the knowledge of puerperas regarding PPE. Wagner et al.\(^{(13)}\) hold that educational programmes can be initiated and implemented in postnatal units for the improvement of PPE and enriching the puerperas’ knowledge. Table 1 outlines the recommended health education programme. Midwives should emphasise the importance of PPE so that puerperas can be assisted to regain their pregravid state.

Study limitations

The findings of this study could not be generalised to other hospitals in the Limpopo Province because the study was conducted in one tertiary hospital in the Capricorn District of Limpopo. However, the study could be replicated at other healthcare institutions.

Conclusion

The study revealed that 36 (72%) puerperas did not exercise because of a lack of knowledge regarding PPE. The high rate of ignorance with regards to the importance of PPE indicates that there is an urgent need for registered midwives to initiate, develop and implement sustainable educational programmes on PPE in maternity units.

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Table 2. Exercises following C/S

<table>
<thead>
<tr>
<th>Day</th>
<th>Types of exercises</th>
<th>Importance</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Foot and leg</td>
<td>To reduce oedema and prevent deep-vein thrombosis</td>
<td>Do ankle circles in different positions, when sitting and/or lying down. Repeat circular pattern 3 - 5 times.</td>
</tr>
<tr>
<td></td>
<td>Deep breathing</td>
<td>To ensure full expansion of the lungs</td>
<td>Exhale slowly against pursed lips, while tightening the abdominal muscles.</td>
</tr>
<tr>
<td></td>
<td>Coughing</td>
<td>Helps to loosen secretions</td>
<td>Patient should cough while seated, with sutures supported by both hands and/or a pillow.</td>
</tr>
<tr>
<td>2</td>
<td>Pelvic floor, curl-up and hip hitching</td>
<td>To regain full bladder control and ensure normal sexual satisfaction</td>
<td>Tilt the pelvis by flattening the hollow of the back on the floor and squeeze pillow between knees.</td>
</tr>
<tr>
<td>3 - 7</td>
<td>Breathing and abdominal</td>
<td>To promote abdominal muscle contraction and tonicity, as well as maintain cardio-respiratory and muscular fitness</td>
<td>Lie down on a comfortable surface with knees bent. Relax and allow body weight to sink into the surface on which you are lying. Contract the abdominal muscles during exhalation.</td>
</tr>
</tbody>
</table>