ORIGINAL ARTICLE

The impact of using direct observation of procedural skill (DOPS) evaluation method on some clinical skills of midwifery students

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Background: The present study was done in order to evaluate the students' clinical skill, enhance the quality of cares given, and consider limitations of common evaluation ways, as well as loss of texts about impact of new evaluation in education. The aim of this study was the impact of using direct observation of procedural skill (DOPS) evaluation method on some clinical skills of midwifery students.

Methods: This quasi-experimental study was performed on 70 midwifery students in the delivery ward of Fatemieh Hospital in Hamadan during the first semester of 2017-2018. In this stage, the students in the control group were evaluated according to the current method of the faculty and the experimental group was evaluated by the DOPS method through a checklist. Finally, the evaluation scores of students were compared in both control and experimental groups.

Results: According to T-test results, the average score in vaginal examination, Leopold maneuver and hearing fetal heart rate has been equal before doing the test ($P>0.05$); however, after intervention the difference between the results obtained from these two groups was significant ($P<0.05$). Then scores prior and after intervention in each group was compared through T-paired test. According to results of this test, before intervention, the difference within two groups were not significant but after intervention ($p>0.05$), the scores have significantly increased in test group ($P<0.05$).

Conclusion: Findings showed that using DOPS evaluation way can be effective in enhancing clinical skills of midwifery students in vaginal examination; however, Leopold maneuver and hearing fetal heart rate are recommended for other procedures.

Key words: Evaluation, Direct Observation of Procedural Skills (DOPS), Clinical skill, Student evaluation

تأثیر به کارگیری روش ارزشیابی DOPS بر مهارت های بالینی دانشجویان مامایی

زمینه و هدف: با در نظر گرفتن موضوع بسیار مهم ارزیابی مهارت های بالینی دانشجویان و افزایش کیفیت مراقبت های ارائه شده، همچنین محدودیت های روش های مرسوم ارزشیابی و کمبود متون در مورد تاثیر آموزش های نوین ارزشیابی، مطالعه حاضر با هدف بررسی تاثیر بکارگیری روش ارزشیابی داپس در انجام مهارت های بالینی (سمع قلب جنین، معاینه ی واژینال و مانور لئوپولد) در دانشجویان مامایی انجام شده است.

روش: این پژوهش یک مطالعه ی نیمه تجربی دو گروهی می باشد که در بخش زایمان بیمارستان فاطمیه ی شهر همدان، بر روی ۷۰نفر از دانشجویان مامایی در طی نیمسال اول سال ۹۷-۹۶ انجام گرفت. دانشجویان گروه شاهد بر اساس روش جاری دانشکده و گروه آزمون بر اساس روش داپس مورد ارزشیابی قرار گرفتند. جمع آوری داده ها با استفاده از چک لیست محقق ساخته قبل و بعد از مطالعه انجام گرفت. داده ها با استفاده از آمار توصیفی، آزمون تی مستقل و تی زوجی مورد ارزیابی قرار گرفتند. P-values < 0.05 معنادار در نظر گرفته شد.

یافته ها: طبق نتایج آزمون T ، میانگین نمره در معاینه واژینال ، مانور لئوپولد و شنیدن ضربان قلب جنین قبل از انجام مداخله در دو گروه برابر بود ($P> 0.05$)، اما پس از مداخله، اختلاف معناداری بین نتایج دو گروه وجود داشت ($P <0.05$). سپس نمرات قبل و بعد از مداخله در هر گروه با آزمون تی زوجی مقایسه شد. براساس نتایج این آزمون، قبل از مداخله تفاوت در هر گروه معنی دار نبود ($P> 0.05$) اما پس از مداخله، در گروه آزمون نمرات به طور معنی داری افزایش یافته است ($P <0.05$).

نتیجه گیری: یافته ها نشان داد استفاده از این روش ارزشیابی در ارتقای مهارت بالینی دانشجویان مامایی در حیطه سمع قلب جنین، معاینه واژینال، مانور لئوپولد، مؤثر و کارامد است و پیشنهاد می شود در سایر پروسیجر ها نیز بررسی و مورد استفاده قرار گیرد.

واژه های کلیدی: ارزشیابی، مشاهده مستقیم مهارتهای رویه ای (DOPS)، مهارت های بالینی، ارزشیابی دانشجو

استخدام الملاحظة المباشرة لطريقة تقييم المهارات الإجرائية (DOPS) على بعض المهارات السريرية لطلاب القبالة

الخلفية: تمت هذه الدراسه اعتبارا لتقييم المهارات السريرية للطلاب و تحسين جودة الرعاية فيهم و أيضًا النظر في قيود طرق التقييم الشائعة و فقدان النصوص حول تأثير التعليم الجديد في التقييم و كان الهدف هو تأثير استخدام الملاحظة المباشرة لطريقة تقييم المهارات الإجرائية (DOPS) على بعض المهارات السريرية لطلاب القبالة.

الطريقة: أجريت هذه الدراسة شبه التجريبية على ٧٠ طالبة من القبالة في جناح الولادة في مستشفى فاطمية في همدان خلال الفصل الدراسي الأول من عام ١٣٩٦-١٣٩٧ شمسيا. في هذه المرحلة ، تم تقييم الطلاب في المجموعة الضابطة وفقًا للطريقة الحالية للكلية و تم تقييم المجموعة التجريبية بواسطة طريقة DOPSو تقييمها بواسطة قائمة مرجعية. و أخيراً ، تمت مقارنة درجات التقييم للطلاب في كل من مجموعات المراقبة و التجريبية.

النتائج: وفقًا لنتائج اختبار T ، كان متوسط الدرجات في الفحص المهبلي ، و مناورة Leopold و معدل ضربات قلب الجنين مساوٍ قبل إجراء الاختبار ($P>0.05$) حينما حصلت فرقا كبيرا بين نتيجة هاتين المجموعتين في هذه المواضيع بعد التدخل($P <0.05$) . ثم تمت مقارنة النتائج قبل و بعد التدخل في كل مجموعة عن طريق اختبار -T الزوج. وفقًا لنتائج هذا الاختبار ، قبل التدخل ، لم يكن الفرق داخل مجموعتين كبيرًا ($P> 0.05$) و لكن بعد التدخل زادت النتائج بشكل كبير في مجموعة الاختبار($P <0.05$) .

الخلاصة: بينت النتائج أن استخدام طريقة تقييم DOPS فعال في تعزيز المهارات السريرية لطلاب القبالة في مواضيع مثل الفحص المهبلي و مناورة ليوبولد و سماع معدل ضربات قلب الجنين و يوصى باستخدامه في إجراءات أخرى.

الكلمات المفتاحية: طريقة التقييم ، DOPS، المهارة السريرية ، القبالة ، الطلاب

Observation of procedural skills (DOPS) روش سے مڈوائفری اسٹوڈنٹس کی کلینیکل مہارتوں کا جائزہ جائزہ

بیک گراونڈ: کلینیکل سطح پر میڈیکل خدمات دینے والے طلباء کی مہارتوں کی جانچ اور ان کی خدمات کے معیار کا جائزہ لینا نہایت اہمیت کا حامل ہے۔ اس امر کی اہمیت یوں بھی بڑھ جاتی ہے کہ اس وقت ہمارے ملک میں طبی مہارتوں کو جانچنے کے عالمی معیارات نہیں ہیں اور اس سلسلے میں ماڈرن کتابوں اور لٹریچر کی کمی ہے ۔ اس تحقیق کا مقصد مڈوائفری اسٹوڈنٹس کی کلینیکل مہارتوں کو چانچنے اور ان کے معیار کو سمجھنے کے لئے مذکورہ بالا ڈاپس ماڈل کا استعمال کیا گیا ہے۔

روش: اس تحقیق میں طالبات کو دو گروہوں میں بانٹا گیا، یہ تحقیق شہر همدان کے فاطمیہ اسپتال کے میٹرنیٹی سیکشن میں انجام پائي۔ اس میں پہلے سال کی مڈوائفری ستر طالبات نے شرکت کی۔ پہلے گروہ کو روایتی طریقے سے کام کرنے کو کہا گیا جبکہ دوسرے گروہ کو ڈاپس ماڈل کے ذریعے زیر نظر رکھا گیا،ڈیٹا کی جمع آور چیک لسٹ کے ذریعے کی گئی، اور ان کا تجزیہ ٹی ٹسٹ اور ٹی پیرڈ ٹسٹ کے ذریعے کیا گیا۔

نتیجے: ٹی ٹسٹ کے نتائج کے مطابق اندام نہانی کے معائنے، لئوپولڈ مینور اور جنین کے دل کی آواز سننے میں دونوں گروہوں کی کارکردگي ایک جیسی تھی لیکن ڈاپس کے استعمال کے بعد دونوں گروہوں کی کارکردگي میں فرق آگیا اس کے بعد ٹی ٹسٹ سے دونوں گروہوں کے پوائنٹس کا موازنہ کیا گیا جس میں اوسط نمبروں میں کافی اضافہ دیکھا گیا۔

سفارش: اس تحقیق سے معلوم ہوا ہے کہ ڈاپس ماڈل مڈوائفری کے مختلف کاموں کو بہتر بنانے میں موثر واقع ہوا ہے ، اسی بناپر سفارش کی جاتی ہے کہ اس طریقے کو دوسرے میڈیکل امور میں بھی استعمال کیا جائے۔

کلیدی الفاظ: ڈاپس ، کلینیکل مہارت ، مڈوائفری اسٹوڈنٹس

INTRODUCTION

Evaluation is one of the most important aspects in educational activities which helps us to detect weak points and strengths of educational procedures and improves positive aspects, as well as removes the weaknesses. So it causes walking important steps in reforming and changing the education system (1, 2). Evaluating clinical ability of students is one of the most important and the most difficult duties of faculty members and health educators (3). Clinical evaluation includes more than half of total evaluations between medical science students such as midwifery students (2).

Clinical education is one of important and basic pillars in midwifery education (4) because the internship period plays a crucial role on forming basic skills and professional abilities in medical science students (5). In common evaluation ways, students' clinical skills are not evaluated exactly, so in the internship period the evaluation methods have mostly the following problems: 1- disproportion with educational goals 2- loss of enough efficacies in assessing students' clinical skills and their performances (6). Research showed 62% of boy students and 82% of girl students believed that it's not possible to evaluate all skills by common evaluation ways so this disaffection can be disincentive in learner's learning (7). In addition, 74.5% of midwifery students in Babol medical sciences reported problems in clinical evaluation (8). For some years the experts have been looking for valid ways to evaluate students' clinical efficacy effectively (6). Nowadays, different ways have been designed for students' clinical evaluation such as: OSCE (Objective Structured Clinical Examination), Portfolio, Mini-CEX (Mini- Clinical Evaluation Exercise) and DOPS (Direct Observation of Procedural Skills (9). In different studies, there have been mentioned several benefits of new evaluation tools, for example in Habibi's study it was shown that DOPS and Mini-CEX caused improvement in students' clinical skills in Medical Sciences, so they suggested that in nursing education centers these two methods can be used for evaluating clinical procedures and improving students learning (10). One of common ways for assessing clinical skills is DOPS (11). DOPS is a student-based evaluation method which promotes self-based learning because students should detect their learning requirements and choose an evaluation plan and desired skill, so DOPS provides an opportunity for teaching, monitoring, and feedback (12, 13).

DOPS test contains observing a student while doing practical procedure on a real patient (11). In this way, teacher's observations are noted according to checklist, so the students can see the feedback according to observational and real findings. The number of tests is varied based on the main required skills for learning and they can be increased up to 8 tests during a single period (14, 15). According to study done in England royal college, this method has a good efficacy to be used in clinical procedural evaluation (16). In addition, getting feedback is one of the main parts of this test that shows the importance of this test in clinical education, therefore this test plays an important role in formative assessment and is a part of skill education (17). Educational impact of DOPS showed that using this tool is not only an encouragement for learners, but it can show the student the important things that lead him/her to learn as the structure of the test is directly in contact with clinical performance (18). Up to now, little studies have been done about new evaluation methods in clinical education; however, several studies have confirmed the efficacy of new methods, especially DOPS in assessing clinical skills (10, 19, 20). Evidence from research conducted in the country suggests that the evaluation of DOPs in midwifery is limited. The importance and necessity of conducting a valid test for evaluating clinical performance of midwifery students and the lack of research in this scope let this study evaluate the DOPS evaluation method on a number of midwifery students' clinical skills.According to previous research, DOPS teaching method is not only motivational and encouraging for learners, but also since the method and content of the test are directly related to clinical practice, it can remind learners the important points. Since the Leopold's maneuvers, fetal heartbeat, and proper vaginal examination are basic principles in midwifery, the researcher decided to improve the DOPS method of student skills in these procedures. So considering these data and students' clinical skill evaluation, also enhancing the quality of cares given besides limitations of common evaluation ways and loss of texts about the impact of new evaluation method, the present study was done on midwifery students of Hamedan medical science university with the goal "The impact of using Direct observation of procedural skill (DOPS) evaluation method on the some clinical skills of midwifery students". Findings of this study can provide valid information about the impact of DOPS method in clinical performance of midwifery students, enhancing their competence, and improving the quality of cares given in bedside.

METHODS

This study is a two-centered and quasi-experimental research done in maternity ward of Fatemieh hospital in Hamedan city, Iran, during the first half of the year 2016-17. This study was approved by the national center of strategic research of medical education (the number: 960153). The research Ethics Committee of the national center of strategic research of medical education approved the study protocol. Moreover, in order to observe the moral considerations of the study, a written introduction letter was received from the Research Deputy of the university. The researchers referred to the participants and explained them the aims of the study. Also, all the participants took part in the study voluntarily.

The study population consisted of all third year midwifery students in the School of Nursing. The childbirth internships in Fatemieh hospital were chosen by census. They were simply randomized and divided to control and intervention groups. The inclusion criteria were as the following points: 1- Students who were trained in maternity training with a background in this course, 2- students in the intervention group who were attending either a DOPS introduction session before the intervention began or at the beginning of each training session. 3- Also they shouldn't have been evaluated by a tool other than DOPS in this semester.

Students who were evaluated fewer than twice for each of the selected techniques (vaginal examination, Leopold maneuvers, Fetal Heart Rate (FHR) Auscultation) in DOPS method were excluded. The sample size was determined according to some previous similar studies (21, 22).

Therefore, 70 midwifery students were selected through a convenience sampling method; all students who met the inclusion criteria entered the study. Then, they were divided into intervention (DOPS with 35 students in addition to current method) and control (current method with 35 students) groups according to the training transposition. 10 clinical teachers distributed in control and experimental groups randomly. These teachers passed education workshop of new evaluation techniques before the research started.

Considering the related literature and nursing and midwifery faculty members' ideas, the evaluation checklists were prepared for each skill by the researchers. The checklists were used after the validity was determined. The content validity of the researcher-designed questionnaire was determined by experts and ten nursing and midwifery faculty members. The Content Validity Index (CVI) was 0.9 and the test-retest method was (ICC=0.85). The reliability of the questionnaire was confirmed by Cronbach's Alpha, which was $\alpha=0.8$.

This checklist which consisted of three skills (vaginal examination, Leopold maneuvers, and Fetal Heart Rate (FHR) Auscultation) was confirmed by nursing and midwifery faculty members in Hamedan University of medical sciences. In checklist, the steps were appropriately considered for every procedure, 17 steps for vaginal examination, 20 steps for Leopold maneuvers, and 17 steps for FHR Auscultation (5-point Likert scale including, Lack of skill (score 0), Less than expected (score 1), Boundary limit (score 2), As expected (score 3) and Higher than expected (score 4).

Before starting evaluation, 4 hours' workshop was held for teachers willing to contribute in this research. The next step was administrating of evaluation program. In this stage, the students of control group were evaluated by school common method; however, the intervention group was evaluated by DOPS. In intervention group, clinical skills of students were assessed by checklist. Evaluation steps included:

1- *First stage test*: observing skills (vaginal examination, Leopold maneuvers, Fetal Heart Rate (FHR) Auscultation) in 15 minutes and giving feedback in 5 minutes: Overall 60 minutes for 3 skills.

2- *Second stage test*: repeating first stage test after 2 weeks (emphasizing on strengths and weak-points of the student): Overall 60 minutes for 3 skills.

3- *Third stage test*: repeating first stage after 4 weeks from first stage and considering the final score: Overall 60 minutes for 3 skills.

In control group, three skills were done in just one stage, meaning the clinical instructor taught the skill and asked the student to repeat the skill. According to the common method, clinical skill evaluation was performed at the same stage. In common method of school of nursing and midwifery during the internship period, students' skills were mentally judged by the teacher and scoring was based on this judgment. The role of the control group in this study was to compare the clinical performance scores of the students without any feedback and intervention with the mean of the intervention group with feedback and intervention. For intervention group, scores of every skill were put in a special checklist separately and each score was recorded at every evaluation step. The progress of the students was assessed and the mean score of all three evaluation stages for each skill was considered separately. Eventually, the final score was noted.

The reason of doing 3 evaluations for intervention group is that since the base is giving feedback, so by repeating tests, the goal will be successive feedbacks given for covering students' weak-points if they repeat their mistakes, therefore the students can have more focus on their mistakes. Testers observed students while doing skill and wrote their observations in checklist, so that students could receive feedback in a suitable place and strength their weak-points.

Data were analyzed through descriptive (mean $\pm$ SD) and analytical (T-paired, independent *t*-test and analysis of covariance) statistics by SPSS- 21. Also, to check study hypothesizes and data distribution these tests were used: Kolmogorov- Smirnov, Shapiro-Wilk. $P < 0.05$ was considered significant.

RESULTS

Seventy midwifery students participated in this study. From these students 35 were in control group and 35 in intervention group. Mean age in control group was 20.45 ± 1.31 and in experimental group was $20.14\pm .051$. There was no significant difference between two groups in terms of students' age distribution.

According to independent T-test, semester average scores in control group was $17.47\pm .66$ and in intervention group was $17.36\pm.86$. Two groups were not significant statistically ($P>0.05$).

Results of these tests showed that the normality suggestion for most of scores in both groups is true, but some variables were significant statistically ($P<0.05$) which shows deviation or normalizing in dependent variables; however, the measure of skewness and kurtosis and Q-Q graphs for dependent variables in each group showed cooperation of data distribution to normal distribution.

At first by using independent –T test, scores of vaginal examination, Leopold maneuver, and hearing fetal heart rate were compared in both groups before and after intervention. According to results of this test, mean scores were not statistically different before the intervention ($P>0.05$) but after that, the differences between two groups have been significant in scores of participants ($P<0.05$) (Table1).

Using paired –T test, scores of before and after intervention were compared within groups. According to the results of this test, after intervention, the scores of participants have increased significantly in experimental group ($P<0.05$) but not in the control group (Table1).

Also for more accurate evaluation on impact of intervention on clinical skills (vaginal examination, Leopold maneuver, and fetal heart rate Auscultation scores), at first the scores were moderate before intervention by using analysis of

covariance test. Leven's test was done as the prerequisite of analysis of covariance test. Leven's test scores reported equal variances in independent groups (P>0.05). According to the results of this analysis, the significance of clinical skill scores (vaginal examination, Leopold maneuver, and fetal heart rhythm) in the study group (P <0.001) indicates that the intervention had a significant effect on changes in these skill scores after intervention (Table 2).

DISCUSSION

The aim of the present study was to determine the impact of using DOPS evaluation method on clinical skills of midwifery students in Hamedan medical science university. Findings showed that using DOPS evaluation method causes improvement in quality of clinical skills of midwifery students, specially, in vaginal examination cases, Leopold maneuver, and Fetal Heart Rate Auscultation through getting higher scores after intervention.

Studies which compared the effect of DOPS and conventional methods revealed that DOPS is more effective than other methods. Several studies indicated that students' performance after the first stage of evaluation with DOPS was improved in the second stage.

Cobb et al, reported that the format of DOPS has a positive

Table 1. Scores of Clinical skills (vaginal examination, Leopold maneuver and hearing fetal heart rate) in DOPS and control group before and after intervention

Skill	Group	Before intervention		After intervention		P-value*
		Mean	SD	Mean	SD	
Vaginal examination	DOPS	23.88	3.73	60.74	5.20	t=30.584 df= 34 P < 0.001
	Control	23.48	3.64	23.42	3.75	t= 0.284 df= 34 P = 0.777
	P-value**	t= 0.453 df= 68 P = 0.65		t= 34.387 df= 68 P < 0.001		
Leopold mane	DOPS	31.62	3.78	71.71	5.73	t= 28.071 df= 34 P < 0.001
	Control	31.08	3.76	31.20	3.65	t= - 0.627 df= 34 P = 0.535
	P-value**	t= 0.602 df= 68 P = 0.549		t= 35.241 df= 68 P < 0.001		
Fetal Heart Rate Auscultation	DOPS	26.94	2.15	61.11	5.16	t= 35.334 df= 34 P < 0.001
	Control	26.74	2.10	26.51	2.27	t= 1.850 df= 34 P = 0.073
	P-value**	t= .393 df= 68 P = .696		t= 36.247 df= 68 P < 0.001		

*Paired –T test
** Independent –T test

Table 2. Analysis of covariance results on clinical skills (vaginal examination, Leopold maneuver and fetal heart rate Auscultation scores)

	Variation source	Total squared	Coefficient in model	Degrees of freedom	Mean squared	F –test statistic	Significant level (sig)
Clinical Skills	Past vaginal score	82.051	0.298	1	82.051	4.167	0.000
	Past Leopold maneuver score	1.466	.039	1	1.466	0.063	0.000
	Past hearing fetal heart rate score	55.493	0.424	1	55.493	3.614	0.000

R^2= 0.949 (adjusted R^2= 0.947).

influence on approaches to learning. There is a conflict for students between being prepared for final examinations and clinical practices (23). A study conducted by Naeem has also recognized DOPS method as an effective tool for improving clinical skills (24). Some other studies have also mentioned this issue (25, 26). Also, the results indicated that DOPS tests had a significant impact on improving student learning. The results of Holomboe et al. study on medical students showed that the students who were evaluated by DOPS had a high skill level (27).

Chen et al. also suggested that DOPS tests in senior medical students have contributed to the increase of self-report, skill upgrading, as well as self-confidence (28). In a study in Taiwan, Tsui et al. stated that this type of test has a significant role in upgrading the skills and empowering medical students (29). In a study conducted by Habibi, using both DOPS and MINI-CEX methods had caused clinical skill improvement in nursing students in doing procedures (10).

Also, Hoseini et al., reported that undergraduate midwifery students in DOPS group were significantly more satisfied than those who use the current method (22). The results of the reviewed papers support the positive effects of assessing medical sciences students' performance by DOPS. Accordingly, it is suggested that teachers should employ this method to assess students' clinical performances (30). All of the above studies are in line with the present study, and it can be concluded that in addition to being applied as a suitable method for evaluation purposes, DOPS can be used as an educational tool to educate and empower students.

In contrast, Bindal et al. study in the UK showed that DOPS method cannot be used as a useful educational tool in improving practical skills (31). This could be due to the problems in conducting DOPS tests, which were pointed out in the study by Bindal et al. According to their reports, the quality of conducting the tests was poor. Biased approaches towards participants and the stressfulness of the tests were the major weaknesses highlighted by previous studies (32-34). According to Bould et al., DOPS focuses on procedural skills: it describes nine areas of pre and postoperative and non-technical care skills. Actual evaluation of procedural skill is limited to a single domain (34). Also according to the results of a review study done by Erfani Khanghahi in Iran, some of the main weaknesses of this method are as follow: being stressful, the time limit for participants, bias/ dissimilarity of assessors, and requiring a great deal of coordination (35).

The strengths of this evaluation method are providing feedback to participants, promoting clinical skills of participants, autonomy during evaluation, great relevance to the courses and required skills, acceptability of this approach by participants, and its formative nature.

Some limitations should be noted: the first limitation of the present study is stemmed from the fact that there are multiple appraisers and probably bias between them, regarding the control bias between appraisers due to different work experiences, literacy levels, etc., so assessing bias between appraisers is mentioned as a limitation. Moreover, due to the nature of the DOPs evaluation method, the intervention group was aware of the details of the final evaluation and this issue could not be controlled.

Despite of the mentioned limitations in present study, its strength is that this evaluation method is used to enhance the clinical skills of midwifery students, which has received less attention in comparison to other medical sciences. So, it is recommended that similar studies should be conducted in larger scopes and more different regions of the country. Also it is recommended to universities to use this method alongside with other ways for evaluating clinical procedures and improvement of students' learning.

Considering the positive impact on learning of the DOPS evaluation method on the clinical skills of midwifery students, using this evaluation is recommended to enhance the quality of clinical student skills in different fields.

Ethical considerations: Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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