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Ethnoscience in Biology Learning on Reproductive System Materials

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Abstract: This research aims to examine ethnoscience in biology learning on the reproductive system. The research method is a quantitative approach with a *quasi-experimental type of research* with pre-test and post-test applied and grouped into three categories of high, medium and low. The research was carried out at the Darussalam State Madrasah Aliyah Aceh Besar Regency, Aceh. The research results show that there has been an increase in students' understanding and abilities which can be seen from the increase in post-test results. Ethnoscience on the reproductive system can be studied from a series of cultural practices from the process of pregnancy to birth. Students can connect scientific science with real science in their environment. Students can also appreciate and preserve local community knowledge related to reproductive system material. So it can be concluded that ethnoscience learning can enrich students' experiences by introducing local wisdom and cultural diversity that exists in society.

Keywords: Ethnoscience; Biology Learning; Reproductive System

Introduction

Biology is a science that studies life and living creatures. Biology has many branches of science, one of which is the reproductive system (Atiyah et al., 2020). The reproductive system is an organ system that functions to produce offspring (Auriemma et al., 2020; Kordowitzki et al., 2020; Prior, 2020). The reproductive system is an important subject to study in biology, because it is related to life processes, species continuity and genetic variation. However, reproductive system material is often considered difficult, boring and taboo by students (Brunham et al., 2020;Jing et al., 2020). This can reduce students' interest and motivation to study biology (Tri Pudji Astuti, 2019; Yustina et al., 2020). Therefore, learning strategies are needed that can increase students' understanding, skills and positive attitudes towards reproductive system material. Learning strategies are needed that can attract students' interest. K 13 which supports learning to utilize culture for the development of science, culture, technology and art which can build students' curiosity and ability to utilize it appropriately (Aji et al., 2020;Sumandiyar et al., 2021).The values that form the foundation for behavior, as well as habits and traditions are often known as ethno (Caiado et al., 2020).

Ethnoscience is knowledge that originates from facts and beliefs in people's lives that have been passed down from generation to generation (Risdianto et al., 2021) Ethnoscience can reveal the cultural, social and religious values contained in local community knowledge (Verawati et al., 2023a). The same thing was also conveyed by Suprapto et al., (2021) who stated that in ethnoscience studies teachers and educational practitioners will be encouraged to be able to use cultural knowledge and local wisdom in teaching science to students (students). Ethnoscience taught to students can help in solving various problems in life (Nuralita et al., 2020).

Wahyu (2017) states that forms of ethnoscience will be more easily identified through educational processes about daily life developed by culture, including processes, methods, models, methods and study materials (Verawati et al., 2023b). Knowledge such as

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traditional rituals, use of nature, traditional medicine, games, traditional rituals, fairy tales, traditional dances, traditional games, traditional houses is one form of the ethnoscience education system (Wibowo et al., 2019). Ethnoscientific identification is included in learning related to cultural knowledge possessed by the local area. Apart from that, Sudarmin (2015) stated that ethnoscience has a study that is centered on culture, which is the definition of an effort to clarify the societal and social conditions and situations faced. So that the values and character of students will be formed and instilled from the values that exist in the community around them (Love et al., 2022).

Science learning that does not accommodate children's culture will result in rejection or children will only accept some of the concepts taught in science. This is what Stanley and Brickhouse (2001) said that teachers must provide a fair and balanced portion between knowledge of Western science (normal science appropriate to classroom learning) and native science (science related to culture) through cross-cultural means. Local culture and wisdom really need to be implemented in education as a guide and reference for behavior by students (Gunawan, 2015). Integrating ethnoscience in biology learning, especially in reproductive system material, will be a fun learning strategy. By integrating ethnoscience in biology learning, students can learn biology in a more meaningful, relevant and contextual way. Students can connect scientific science with real science in their environment. Students can also appreciate and preserve local community knowledge related to reproductive system material (Lestari et al., 2020).

The use of ethnoscience in biology learning has many benefits, including: (1) Increasing students' understanding, skills and positive attitudes towards biology material. (2) Connecting scientific science with real science in the students' environment. (3) Respect and preserve local community knowledge related to biological material. (4) Forming students' nationalistic and multicultural character. (5) Foster creativity and preserve local culture in society (Alamsyah et al., 2022).

Based on the description above, this research aims to examine the importance of ethnoscience in biology learning, especially regarding reproductive system material. Sibagariang (2010) explains that the reproductive system is defined as the process of reproduction or the process of increasing the number of new individuals as a result of birth, cell division and other reproductive methods. From this definition it can be understood that reproduction is a process of producing new individuals, and reproduction only occurs in living creatures. Reproduction is carried out as an effort to defend itself by producing the next generation. Irianto (2014) added that reproduction is a very important human function, because with reproduction humans can defend themselves from extinction. The reproductive process cannot be separated from cultural elements (Suryawati, 2007). In reproductive culture, each society has its own way of dealing with it, including the culture of pregnancy through to the birth process. It is hoped that this research can contribute to the development of science, education and society. Especially in biology learning about the reproductive system (Zhao, 2021).

Method

Quasi-experimental type of research with pre-test and post-test treatments applied and grouped into three groups, namely high, medium and low (Siedlecki, 2020; Gopalan et al., 2020; Miller et al., 2020).

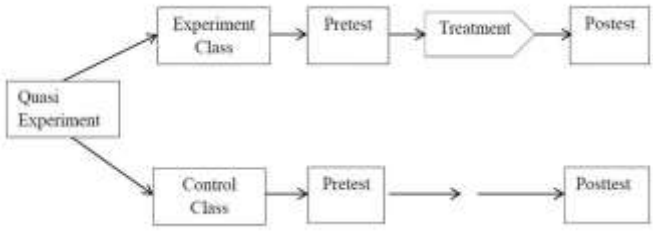

Figure 1. quasi-experimental type of research with pre-test and post-test treatments applied and grouped into three gps

The research was carried out at the Darussalam State Madrasah Aliyah Aceh Besar Regency, Aceh. The research was carried out for 3 months with the number of students involved as research objects totaling 63 eleventh grade students (Mulyani et al., 2023).

Results and Discussion

Percentage of Increase in Student Scores on the Application of Ethnoscience in Reproductive System learning

From the test results based on the high, medium and low group tests, it can be seen that there was an increase in student learning outcomes before ethnoscience learning (pretest) and after the learning was implemented (protest). The increase ranged from 59% to 84%. In the high group, students who had pretest scores between 70-100 were 41% pretest and 90% posttest. This data has shown a significant increase, while in the medium group students who had scores between 65-74 were 43% in the pretest and 77% in the posttest. In the low group, namely the score range between 50-64, there was a pretest of 84% and a posttest of 42% (Lightner et al., 2021). Pretest scores are predominantly in the low group with scores between 50-64. However, on the contrary, the post-test scores were

dominated by the high group with an N Gain score of 84. From the test results it can be seen that students who received material on the reproductive system with the application of ethnoscience were able to improve their understanding and the post-test results showed that the scores of most students were in the high group, namely 90%. To make it clearer, the following graph shows student test results, both pre-test and post-test. In the graph, student scores will be grouped based on three categories, namely; high, medium and low (Idul et al., 2023).

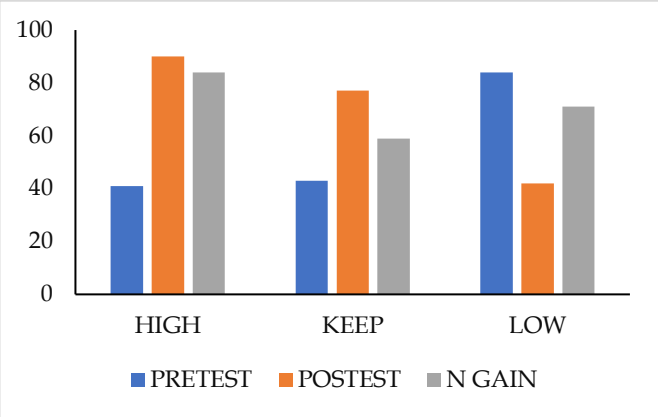

Figure 2. Test Results Based on High, Medium and Low Groups

Ethnoscience During Pregnancy

Mee bu culture is one of the traditions inherited from our ancestors. The word *mee* means to deliver and *bu* means rice. So *mee bu* means delivering a package of rice and side dishes. In Acehnese society, *the mee bu culture* is implemented in the seventh month of pregnancy. The process of implementing this culture involves two large families, namely the husband's family and the wife's family. The technical implementation of the *mee bu ceremony* starts from determining the day for the ceremony which is agreed upon by both parties. Usually the days chosen for this activity are holidays and Fridays (Suprihadi et al., 2022). According to people's beliefs, Friday is a glorified day so that ceremonies held on that day can run smoothly and be blessed. However, there are also families who carry out this ceremony on holidays such as Saturdays and Sundays, with the hope that all those invited can attend and not disturb work (Wardani et al., 2023).

After determining the day, the mother-in-law then invited her relatives, neighbors and traditional leaders to help her prepare all the necessities and take them to her daughter-in-law's house. The number of invitations really depends on how big or small the ceremony is being held. Families who have material capabilities will invite more than a hundred women consisting of relatives, neighbors, friends and traditional leaders (Ramli et al., 2023).

The ingredients prepared for the *mee bu ceremony* consist of *bu kulah* (rice wrapped in young banana leaves that have been steamed and then the rice is wrapped in a pyramid shape), side dishes consisting of fish, grilled chicken, beef, sticky rice, cakes. and various fruits. The dishes made especially for his pregnant daughter-in-law were grilled fish, beef, grilled chicken, curry-cooked duck, eggs and various types of fruit. Apart from these ingredients, the in-laws also prepare betel leaves (betel complete with ingredients such as areca nut, gambier, lime, cloves and tobacco or in regional language it is called bakong).

After all the necessary materials are ready, the in-laws' group will leave for the in-laws' house. At the house, several parents and traditional figures were waiting to welcome the husband's family. When the group arrives home, they will be greeted and invited to go up to the house. Guests are invited to sit on the seuramoe keue (front porch/living room), and Dara Baro's family is on the back porch (seuramoe likot).

The materials brought earlier will be given to the daughter-in-law's family and will be taken to the back to be opened. Next, the husband's family group was treated to food and various types of fruit and fish which they would enjoy together. The pregnant daughter-in-law will be invited to sit with her husband to enjoy the food that has been served to them. The atmosphere was happy and joking, the pregnant woman became the center of attention of all the attendees who took turns cheering her on. After finishing the meal, the husband and wife continued with the *peusijuk ceremony.* The purpose of this *peusijuk ceremony* is to pray for safety and health for the mother and baby in the womb (Aithal et al., 2019).

The following is a picture of the *mee bu process* where various kinds of side dishes are served in front of a married couple decorated with banana leaf packages to increase the appetite of the pregnant wife. And continued with the ceremony *Peusijuk* is carried out for husband and wife couples with the aim of praying for the whole family so that the baby in the womb will always be given health and safety until the day of birth arrives (Murwitaningsih et al., 2023).

Figure 3. The process of *mee bu* and *peusijuk* for a married couple

It is customary in society that after the event is over, the mother-in-law does not go home with the group, instead she stays a night or two at her daughter-in-law's house to have a friendly chat while comforting her daughter-in-law so that she doesn't get lost in thought and doesn't worry about thinking about the difficult time of giving birth later (Kasi et al., 2021). The mother-in-law will tell many things related to her experiences and try to make her daughter-in-law calmer and ready to go through the birthing process later (Hikmawati et al., 2021).

Mee bu culture in its implementation contains many good lessons and values from a scientific perspective. The culture of bringing delicious food to stimulate the appetite of women who are heavily pregnant is a tradition that medically has a very positive impact on mothers who are in their third trimester of pregnancy. As research by Syari (2015) states that the growth and development of children is determined by the condition of the fetus in the womb and the mother's nutritional intake during pregnancy (Zulirfan et al., 2023). Pregnant women with insufficient food intake during pregnancy will experience growth disorders and low birth weight (LBW) and stunting (Rahila et al., 2016). The bad effects that arise if a baby is born LBW are that it is prone to death in the baby (Sutan, 2014) and has a high chance of stunting (Ikeda, 2013; Meilyasari, 2014; Paudel, 2012).

The type of food brought by the in-laws to their daughter-in-law who is heavily pregnant, if examined medically, really supports the nutritional needs of pregnant women, increases the mother's immune system and especially for the baby to get adequate nutrition so that it can develop well. Fish contains omega-3 fatty acids, iodine, vitamin B12, which are important for the development of the nervous system in the fetus (Mohibu et al., 2021). Meanwhile, for mothers, omega-3 is also needed to maintain the mother's immune system. Fish is also a source of animal protein which is needed to support the health of the mother and fetus (Salvador et al., 2023). Beef contains iron, protein and zinc. The benefits for pregnant women include, the iron contained in beef can help the formation of red blood cells. If iron intake is insufficient, it is feared that it could cause symptoms of anemia in pregnant women. If this happens, it is very risky for fetal development. It can even cause the fetus to be susceptible to infectious diseases. Apart from iron, beef also contains protein which is good for meeting the nutritional needs of pregnant women. Even the zinc in beef is very useful for increasing the body's immunity in pregnant women and the fetus. Free-range eggs contain vit. E, fat, omega-3 which functions to increase immunity, improve vision function, brain function and heart health. Duck contains animal protein, fat and iron (Hasliyah et al., 2022).

Ethnoscience in its Birth

After the birthing process is complete, the mother begins to observe taboos. The abstinence period is 44 days (during the postpartum period). During this period of abstinence, mothers are prohibited from leaving the house and are not allowed to walk much. During the postpartum period, mothers are only allowed to eat white rice with side dishes that are specially prepared so that they are free from fat (boiled, steamed or grilled) (Sindhwani et al., 2022). The permitted drink is water. Apart from abstinence, mothers also receive post-natal care. This treatment is carried out using special leaves and spices which are beneficial for health (Bongomin et al., 2020).

According to Withers et al., (2018)"Traditional medicines used for postpartum mothers function to help repair the reproductive organs so that they recover as before pregnancy. Some traditional medicinal plants used after giving birth are taken orally and some are used as external medicine (applied topically). Below we will mention various medicinal plants used in the treatment of postpartum mothers (Zubaidah, 2019).

Traditional medicinal plants used by mothers after giving birth to drink include: sweet skin, lawing skin, srapat skin, meusui fruit, salasari skin, seunamaki leaves, genie's beard, gambier, sere, Lampuyang, pucok, kolmus, gadung, mungli turmeric, genoe fruit, dressing fruit, galangal, ginger, licorice root, checker, camcuruih, coriander, mustard wedge, kedawong seed, poppy seed nutmeg, fenugreek, keeling lawing flower, black cumin, white cumin, kusani cumin, jeumuju, seputa fruit, maja keeling fruit, manjakani fruit, serantuk, black pepper, white pepper, kapu laga, kembang bowl, safran, baroeeh flower, pasma sari fruit, cloves, temu lawaak, gala garu, hinggu, cubeb (Yusuf et al., 2022).

The processing of medicinal plants is carried out by; all the traditional medicinal plants above are boiled until boiling. Boiled water from these medicinal plants can be consumed directly, but there are also those who make the concoction into small pills that can be taken like normal pills. To make a pill, boiled medicinal plants are added with candied sugar and boiled until the water disappears. Then the bran from boiled medicinal plants will be made into small granules. Next, the granules are dried in the sun until dry and ready to be consumed. The following is a form of herbal medicine that has been made into a pill and is ready to be consumed (Haulia et al., 2022).

Figure 4. Herbal medicine in pill form

Conclusion

Ethnoscience can be applied in biology learning on reproductive system material and the results of its application show an increase in students' cognitive abilities. Ethnoscience learning can enrich students' experiences by introducing local wisdom and cultural diversity that exists in the surrounding community. Various cultural practices in the reproductive system from pregnancy to childbirth have scientific value and can be explained scientifically.

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Authors Contributions
Investigation, T.M.F, and I.I; formal analysis, T.M.F, and I.I; resources, T.M.F; data cuartion, I.I; writing-review and editing, T.M.F. And All authors have read and agreed to published version of the manuscript.

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Conflicts of Interest
We certify that there's is no conflict of interest with any financial, personal and other relationships with other peoples or organization related to the material discussed in the manuscript

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