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Original Research Article

A Review on the Effects of Montessori Practical Life Activities in Developing Fine Motor Skills in Kindergartners and Proposals for Application in Vietnam

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Abstract: Motor development is an important issue in the early stages of every child's life. Children develop motor skills with age at different rates. Fine motor skills are skills that use the small muscles that control the hands and fingers to help children perform many difficult movements. There are many studies that show that the practical life field in the Montessori method is effective for children's fine motor development. Therefore, the goal of the paper is to provide an assessment of the evidence base for the practice of life field in Montessori education and to suggest practical life activities to put into practice. In early childhood education programs in Vietnam. Besides, the paper provide a review of the evidence base for Montessori education, with the dual aspirations of stimulating future research and helping teachers to better understand whether and why Montessori education might be effective.

Keywords: Montessori method, fine motor skills, practical life activities, effective.

1. INTRODUCTION

Motor development is one of the basic factors for young children to perceive the world around them. The more children grasp the movement, the wider their ability to interact with the world around them. Fine motor skills are one of the foundational skills and need to be developed in preschool age. With the flexibility and dexterity of the hands, the precise coordination between vision and movement will help children explore the world and acquire knowledge in many different aspects. This is also an important skill that affects the development of children in other aspects such as intellectual, language, emotional and social skills.

Maria Montessori pointed out that the development of fine motor skills is directly connected to the development of the brain. In a Montessori pre-school classroom, children thus participate in many activities that help improve their fine motor skills (coordinated small muscle movements in the hands, wrists, and fingers) so that they will be able to engage in practical life activities independently. This link between fine motor skills and cognitive perception is due to their relationship in a developmental loop. As Adolph and Berger (2006) comment, "Perception allows action to be planned prospectively and gears action to the environment. Motor actions complete the perception-action loop by generating information for perceptual systems and bring the appropriate sensory apparatus to the available information." It is therefore exceedingly important to engage and encourage young children in fine motor activities, for the benefit of their future success and happiness.The Montessori environment is one which keenly engages these skills from a young age. Maria Montessori understood fine motor development to be one aspect of a balanced approach to guided development that included mental, physical and moral aspects [21].

Montessori education has many benefits, and amongst this is the recognition that the care and management of the environment is the primary means for children to refine their motor skills. This prepared environment is set out to provide children with maximum opportunities to develop toward their full potential. A distinguishing feature of the Montessori program is the inclusion of what Maria Montessori coined 'educational gymnastics'. This is a range of planned exercises to develop coordination in fingers. These are specifically found in the practical life materials, which are one of the five key learning areas of the Montessori curriculum.

Therefore, the goal of the paper is to provide an assessment of the evidence base for the practice of life field in Montessori education and to suggest practical life activities to put into practice. In early

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childhood education programs in Vietnam. Besides, the paper provide a review of the evidence base for Montessori education, with the dual aspirations of stimulating future research and helping teachers to better understand whether and why Montessori education might be effective.

2. METHODS

In this study, the author uses the following research methods: (1) descriptive research (qualitative description) used to propose practical life activities for preschools; (2) content analysis method is a research technique to systematically and objectively describe the content of fine motor development activities in the current preschool education program; Presents the contents of the field of practical life in the Montessori method, on the role of fine motor in the development of preschool children.

Search Strategy: This review is based on the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement [7]. Literature search using the following keywords: "Montessori method", "practical life materials", "practical life activities", "fine motor", "child development".

Relevant articles were identified from the following databases: PubMed, Cochrane library, Web of science, Scopus and Google scholar, Scientific journals of Vietnam. Manual search was also performed. Electronic databases were searched without time restriction till August 2022. The eligibility criteria were as the following: Inclusion criteria: Studies: any studies published in English, Vietnamese language at any time till August 2022, Participants: children.

3. RESULTS

3.1. Studies on the effect of Montessori practical life activities on the fine motor development of preschool children

According to the study "Educational Gymnastics: The Effectiveness of Montessori Practical Life Activities in Developing Fine Motor Skills in Kindergartners" by Punum Bhatia, Alan Davis, Ellen Shamas-Brandt (2015), it mentioned that: A quasi-experiment was undertaken to test the effect of Montessori practical life activities on kindergarten children's fine motor development and hand dominance over an 8-month period. Participants were 50 children age 5 in 4 Montessori schools and 50 students age 5 in a kindergarten program in a high-performing suburban elementary school. Children were pre- and posttested on the Flag Posting Test, an individually administered test of fine motor skill requiring children to place tiny flags mounted on pins into preset pinholes. Students in the Montessori treatment group demonstrated significantly higher accuracy, speed, and consistent use of the dominant hand on the posttest, adjusted for pretest differences and gender. Effect sizes were moderate for accuracy and speed (ds = .53 and .37, respectively) and large for established hand dominance ($\Delta R2 = .35$). Longitudinal research on the effects of early childhood programs emphasizing the reciprocal interplay of cognitive and physical aspects of activity is recommended. Practice or Policy: The findings argue for a balanced approach to early childhood education that maintains the importance of physical activity and fine motor development in conjunction with cognitive skills. Montessori practical life activities involving eye–hand coordination and fine motor skills can be integrated into programs [1].

Noura M. Naguib and her colleagues (2022) mentioned that Fine motor skills: 4 included studies "Educational gymnastics: The effectiveness of Montessori practical life activities in developing fine motor skills in kindergartners"; "Montessori public school pre-K programs and the school readiness of low-income black and Latino children"; "Embedding video-based modeling handwriting instruction in a Montessori preschool phonics program"; "Effects of practical life materials on kindergartners' fine motor skills" reported measurement of fine motor skills by different measures; the flag posting test [1] learning accomplishment profile-diagnostic (LAP-D) [4]; lowercase letter formation skill [5] and penny posting test [10]. Students in Montessori posttest demonstrated high accuracy, speed and improvement in handwriting ability [5]. Executive functions: its measurement was reported in 5 included studies "Cognitive control at age 3: Evaluating executive functions in an equitable Montessori preschool"; "Montessori preschool elevates and equalizes child outcomes: A longitudinal study."; "Executive functions in children of 9 and 12 years old in Montessori method."; "The effects of environment on children's executive function: A study of three private schools."; "Preschool children's development in classic Montessori, supplemented Montessori, and conventional programs." Are using different scales; the flanker and the dimensional change card sort tests the head-toe-knee-shoulder (HTKS) task that involve working memory, planning and attention, neuropsychological assessment (NEPSY–II scale) the neuropsychological assessment of executive functions in children (ENFEN) and neuropsychological maturity questionnaire for school (CUMANES) and the behavior Rating Inventory of Executive Function scale (BRIEF).

Activities of daily living and physical activity: one study "The effects of Montessori training program for mothers on mathematics and daily living skills of 4-5 year-old Montessori children" measured daily living skills by the basic skill inventory scale (BSIS) in 4-5 years Montessori children. Children who received Montessori only and their mothers were not supported by specific Montessori training program, showed significant positive improvement in daily activities [11].

Another study has shown that this study explored the effect of fine motor skill activities on the development of attention in kindergarteners (n = 68) in five classes at a suburban public school in the Intermountain West through a pretest/posttest experimental group (n = 36) control group (n = 32) design. All children received the regular curriculum which included typical fine motor activities such as painting, coloring, writing, and play activities with small items. (Stewart, R.A., Rule.A.C., & Giordano.D.A. (2007)). The treatment was a series of supplemental fine motor activities in which children used tongs, tweezers, and spoons to move small items. The assessment was the attention subtest of the Cognitive Assessment System (CAS) (Naglieri, J. A., & Das, J. P. (1997). Cognitive assessment system. Itasca, IL: Riverside). A significant group × sex interaction with females positively responding to the treatment was found, suggesting that fine motor skill activities are effective in increasing female kindergartners' attention [12].

The study "Effects of Practical Life Materials on Kindergartners' Fine Motor Skills" of Rule.,A.C., Stewart., R.A. (2002) has show that: A pretest-posttest control group design was used to measure the effect of practical life materials on public school kindergarten children's fine motor skill development over a 6-month period. The dependent measure was a penny posting test. More than 50 different sets of activities were provided to the experimental group (n = 101). Teachers coached students in following specific steps to use tweezers, tongs, and spoons to manipulate a variety of objects. Students then employed the materials during center time in their classrooms. Although experimental and control group teachers reported equal amounts of fine motor activity in their classrooms, significant interaction effects were found indicating the experimental group outperformed the control on the posttest measure. An overall effect size of 0.74 indicates that the type of fine motor activity is important in children's development [9].

Fine motor skills, or dexterity, is something that we often think develops naturally in a child as they grow older. However, there is actually a close relationship between fine motor development and cognitive development. Indeed, extensive studies have been performed over the years and results have concluded that although gross motor skills (the movement of the arms and legs, and other large body part movements) are not predictive of subsequent achievement, fine motor skills are significantly linked to later performance in literacy and mathematics at school. Children with low motor skills are more dependent on others, and according to the research of Losse (1991) they often have behavioural problems and lower achievement at school. Interestingly, many of these children do not outgrow their initial clumsiness [21].

So what difference does the Montessori approach to fine motor development make for children? Researcher Prendergast (1969) found that children who attended a Montessori preschool outperformed children from a similar background attending conventional preschools, specifically in the areas of hand-eye coordination and visual perception. Other researchers have had similar findings. Indeed, it is now estimated that a 5-year-old who has used Montessori practical life activities for over a year will demonstrate greater accuracy, speed and more hand dominance than a group of students in a conventional preschool program [21].

Thus, these studies have shown that the practical life activities in the Montessori method are effective in training and improving the fine motor skills of preschool children. This key learning area incorporates activities which at first glance may seem out of place in a childcare setting. Child sized cleaning materials and a practical life dressing frame are popular features, allowing children to engage in hands-on activities. In particular, the practical life dressing frame teaches children the intricacies of zips, buttons, shoelaces and other clothing fasteners. Another popular Montessori activity which develops fine motor skills is the use of tongs to pick up small objects, like shells or buttons, to transfer them between containers. This activity often introduces the pincer grip (where the thumb, forefinger and middle finger act as a tripod) to children, which is essential for learning to write later on. Essentially, daily practice of fine motor skills takes place in all of these seemingly unrelated activities.

3.2. Introduction to the practical life activities in Montessori method

3.2.1. What is practical life activities?

Practical Life activities are the activities of everyday life and they are involved in all aspects of life. The child observes these activities in the environment and gains knowledge through the real experience of how to accomplish life skills in a purposeful way. These activities are cultural and specific to the child's time and place. Practical life activities help give the child a sense of being and belonging, established through participation in daily life with us. Through practical life the child learns about his culture and all about what it is to be human. Generally the activities of practical life revolve around fives areas: Preliminary Exercises, Caring for the Self, Caring for the Environment, Grace & Courtesy and Control of movement. There is another area which encompasses all four areas and which is a very important part of practical life, namely food. Practical Life activities are an integral part of any Montessori environment. It is therefore important to "Teach teaching, not correcting" (Montessori) in order to allow the child to be a fully functionional member in hios own society. Practical Life Exercises also aid the growth and development of the child's intellect and concentration and will in turn also help the child develop an orderly way of thinking) [18].

3.2.2. What is the Purpose and Aim of Practical Life activities

The purpose and aim of Practical Life exercises is to help children develop coordination of movement, gain independence, adapt to their society, and develop the ability to concentrate. Through the repetition of Practical Life activities, children learn to develop their gross and fine motor skills, problem solve effectively, and establish a strong sense of self by actively contributing to their world.

3.2.3. Five areas of practical life

There are five areas of practical life include:

(1) Preliminary activities: These activities provide the foundation and set the stage for all works in the Montessori classroom. These include such tasks as how to roll and unroll a mat, how to walk around a mat, how to sharpen a pencil, how to put down a chair.

(2) Care of Self**:** These activities provide the means for children to become physically independent. These may include such activities as how to wash hands, how to brush teeth, how to pack a lunch, how to pack an overnight bag, and how to tie shoes.

(3) Care of the Environment**:** Learning how to clean is very important in the Montessori classroom. These activities may include how to set the table, how to clean dishes and cutlery, how to sweep the floor, how to dust the shelves, how to water the plants, and how to clean up spills.

(4) Social Graces and Courtesies**:** These activities are not found on the shelves. Rather, the Montessori teacher introduces social graces and courtesies such as how to shake hands, saying please and thank you, how to interrupt someone, and how to cough and sneeze.

(5) Control of movement: focused on teaching children to refine and coordinate control of their bodies through activities such as walking on the line and the silence game.

3.2.4. Characteristics of Practical Life activities

- *Reality-Based:* The activities need to be based in reality. We wash dirty dishes with real soapy water, we clean shoes with real polish and cut fruit with a real knife. There is safety in reality.
- *Not Limited:* It is a big mistake to think practical life activities are limited by what you have learnt in your training. They are limitless as they will depend on the cultural and environmental needs which will vary so much from environment to environment and country to country. You can create your own by following the theoretical guidelines of what a practical life activity is.
- *One of Each:* While there is no limit to the amount of practical life activities you can have in the environment, there should only be one of each activity. This helps the child to learn that he has to wait and life is not always about immediate gratification. As a result of this the materials become more valued. You can always have spare activities in storage to swap out if one gets broken, but there should only be one on the shelf at a time.
- *Self Contained:* The materials are contained in a basket, tray or set out on a stand in a particular space. All materials should be complete, prepared and ready for use. The adult in the environment is responsible to make sure the activity is prepared with everything the child will need for successful completion of the activity. This helps the child's human tendency and sensitive period for order and it is this external order that helps the child to internalise order.
- *Complete:* The activity needs to be complete. If something needs to be replaced at the end of the activity we show the child how to re-stock the activity. If the activity is incomplete for whatever reason, broken or missing component, the adult needs to complete it or remove it from the shelf.
- *Location of Materials:* The materials should be placed out in their groupings, such as, food activities in the food prep area, the button frame in the care of self area and so on. Water activities should be near a water source to aid the child in performing the activity successfully.
- *Sequential:* Each activity has a beginning, middle and end. One of the cues for beginning an activity, can be putting on an apron. If the child has an apron on, so should the adult wear an apron.
- *Colour – Coded:* Each item in the activity should be colour coordinated or expressed on each item so that the child can identify which items belong together and able to replace pieces successfully. You can use neutral materials and colour code with paint, electric tape, ribbon, etc if coordination is difficult.
- *Manageable Container:* The containers must not be too small or too big for the child to handle. Trays and baskets need to be deep enough to hold contents and thereby prevent items falling out when being carried.
- *Functional:* All materials should have a clear purpose and function in the appropriate manner. There is nothing worse than a utensil that does not do the intended task. The knife really needs to cut. If the utensil does not do its intended task then the child will look for something else to do with it (inappropriate use) or will think that he is unable to do the task that he has seen so many others do. The adult needs to be mindful of the child's abilities when testing the materials.
- *Child-Sized:* Materials must be proportional to the child. Even the size of a sponge or brush must fit the child's hand so the child can use it successfully.
- *Proportional Items:* The materials of an activity must be proportional to each other and functional in terms of size. For example, the bucket must be

small enough for the child to handle but big enough to hold all the water necessary for the exercise.

- *Natural Materials:* Natural materials offer more opportunities for multi-sensorial experiences are more aesthetically pleasing and nicer to the touch.
- *Easily Cleaned: The* materials must be cleaned regularly and be hygienic to use. Natural materials are easier to clean and harbor less bacteria.
- *Safety:* While materials need to be functional the priority is to safety. The use of non-toxic materials is recommended. Sharp objects need to have rounded ends and corners that are sharp should be sanded or covered.
- *Orderly:* Order must always be in a logical sequence, whether it is how you present the material or lay the activity out on the shelf. Before a presentation we lay out the material in order of use. The activities on the shelf should be ordered from simple to more complex from left to right.
- *Cultural:* Practical life activities should reflect the culture of the child's environment, here and now. Choose activities which are prevalent in the culture. There should be no activities that have no relationship to the life the child is living. For example, if there are no windows in the environment there should be no window cleaning exercise.

3.2.5. Reason for practical life activities

Children are naturally interested in activities they have witnessed. Therefore, Dr. Montessori began using what she called "Practical Life Exercises" to allow the child to do activities of daily life and therefore adapt and orientate himself in his society. It is therefore the Directress's task to demonstrate the correct way of doing these Exercises in a way that allows the child to fully observe the movements. Montessori says, "If talking don't move, if moving don't talk". The directress must also keep in mind that the goal is to show the actions so that the child can go off and repeat the activity in his own successful way. Montessori says, "Our task is to show how the action is done and at the same time destroy the possibility of imitation". The child must develop his own way of doing these activities so that the movements become real and not synthetic.

During the child's sensitive period between birth and 6, the child is constructing the inner building blocks and his person. It is therefore important for the child to participate in activities to prepare him for his environment, that allow him to grow independently and use his motor skills. Montessori also saw the child's need for order, repetition, and succession in movements. Practical life activities helps to aid the child to develop his coordination in movement, his balance and his gracefulness in his environment as well as his need to develop the power of being silent.

3.3. Proposals for *practical life activities in early childhood education program in Vietnam*

3.3.1. Objectives and contents of the field of motor development in the early childhood education program of Vietnam

Below are the goals and contents of the field of motor development in Vietnam's early childhood education program according to the Circular promulgating the preschool program dated April 13, 2021 (No. 01/VBHN-BGDĐT) [19].

(1) For Toddlers (2-3 years of age)

Object	Content
- Healthy, weight and height develop normally according to age. - Adapting to the mode of life at the kindergarten - Having some initial motor qualities (agility, dexterity, body balance). - Ability to skillfully coordinate hand and finger movements. - Able to do some self-service in eating, sleeping and personal hygiene.	-Movements develop muscle groups and breathing. -Basic movements and the development of early motor qualities. -Hand and finger movements and hand-eye coordination. - Practice good habits and routines in daily life. -Get used to some self-service, stay healthy. -Recognize and avoid some unsafe hazards

(2) For kindergarten children (3-6 years of age)

Object	Content
- Healthy, weight and height develop normally according to age. - Have some motor qualities: agility, strength, dexterity and endurance, - Perform basic movements in a steady, correct posture. - Ability to coordinate senses and movements; move smoothly, know the direction in - Able to do some self-service in eating, sleeping and personal hygiene.	- Movements develop muscle groups and breathing. -Basic motor skills and development of motor qualities -The movements of the hands, fingers, hand-eye coordination and the use of some utensils and tools. - Identify some common foods and foods and their health benefits -Practice doing some self-service in daily life. - Conservatory healthy and safe.

3.3.2. Proposing practical life activities to develop fine motor for preschool children

Based on the goals and content of the field of physical development, below are suggested practical life activities to develop fine motor for preschool children:

Practical life areas	Practical life activities for Toddlers (2-3 years of age)	Practical life activities for kindergarten children (3-6 years of age)
(1) Preliminary activities	Working with a mat; Call the name; Carrying a Mat; Sit and Stand from a Chair; Carrying a Tray; Moving a chair Transfer objects with a spoon; tongs; tweezers Pouring Grains Pour into a cup/use a funnel Sweep grains Sticking toothpicks Plunking Cloth pegging Opening and Closing Containers Dressing frames with buttoning, tying Matching keys to locks	Call the name; Carrying a Mat; Sit and Stand from a Chair; Carrying a Tray; Turning pages of a Book; Transfer objects with a spoon; tongs; twizzer; Pinser Using chopsticks Pouring Grains Cloth pegging pattern, Sweep grains, sweep floor, sweep rags Transfer water Pouring water Dressing Frame with Buttoning; Zipping; Tying; Buckling, Snapping; using zipper; tie bows; lace shoes Napkin Folding Weaving Sewing a button
(2) Care of Self	Hand washing; Teeth brushing; Face cleaning; Nose blowing Hanging clothing on a hanger; Bringing dirty dishes to sink or garbage; Kitchen activities: Chop vegetables; slice with silicone knives; sectioning a banana; cutting bread; Peeling a carrot	Hand washing; Teeth brushing; Face cleaning; Hair brushing Using napkin Hanging clothing on a hanger; Bringing dirty dishes to sink or garbage; Polishing Shoes; Preparing a Snack; Taking off cloth; Kitchen activities: Cutting bread; Cutting banana; Cutting eggs; Cutting cucumber; Cutting carrot, Cutting apple; Squeeze orange juice; Crush dry bread; Grinding cinnamon; Grinding Herb; Grinding coffee; Peel peanuts; using rolling pin; Using Rolling Pin
(3) Care of the Environment	Wiping a Spill Brush and dustpan Washing a table Flower arranging	Dusting a Table; Polishing a mirror Watering the plants Flowers Arranging; Plant care Setting a Table; Sweeping Cleaning the windows Washing dishes Animal care Recycling sorting
(4) Social Graces and Courtesies	Greeting people; Getting someone's attention Please, Thank You, and You're Welcome Use respectful words Be polite when snacking Follow the order (e.g. line up)	Greeting a Person; Introduction of One's Self; Offering Help to others; Waiting to be served at the table Serving food to others Phone Etiquette Coughing and sneezing Gift giving Shaking hands Making introductions Please, Thank You, and You're Welcome Sharing is caring Respecting oneself, others and the environment;

		Communicating and interacting; Politely with adults and peers, Participating in parties tea Keep promise Follow the rules Express your opinion Listen to other people's opinions
(5) Control of movement	Walking on the Line Silence Game Walking down stairs gracefully	Walking on the Line Silence Game

4. CONCLUSION

Developing fine motor skills is an important and continuous milestone for kids. Practice these Montessori fine motor activities and honor your child's individuality and self-discipline. When taken seriously and presented as an approachable, impactful challenge, these activities hold inherent dignity. It's not "just" getting dressed or "just" juicing an orange if one is doing it oneself. The child is learning to follow a complex motor sequence, independently, in order to fulfill his or her own desires and needs. These skills, when taught early in life, allow children to believe in themselves as well as develop the self-discipline needed for success throughout their lives.

The practical life Montessori curriculum teaches the child things they need to (and are motivated to) learn anyway, and does it in a way that is of a piece with the more academic disciplines, developing the same key fundamental executive and emotional skills. Math, reading, and language all require one to have the ability to focus, to be able to follow logical and sequential steps, to make intelligent choices, to see a task through from start to finish, to persist when one makes a mistake, and to correct one's mistakes—and all of these are present in the process of learning and practicing the practical life activities.

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