GROSTLOG 2024
Global Research on Sustainable Transport & Logistics

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

# ACCESSIBILITY ANALYSIS OF INTERMODAL SHIFT IN THE BLOK M TRANSIT-ORIENTED DEVELOPMENT AREA (STUDY CASE: MRT STATION BLOK M BCA AND TRANSJAKARTA BUS STOP BLOK M)

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**Abstract**: Blok M BCA MRT Station and Blok M Transjakarta Bus Stop, have not been fully integrated properly, hampering passenger movement. This study aims to analyze the accessibility of intermodal displacement in the Transit-Oriented Development Blok M. The method used is qualitative descriptive approach. Data collection by triangulating observation techniques, questionnaires, and documentation to MRT and Transjakarta Blok M passengers. The results of the analysis, it can be concluded that the accessibility value of intermodal movement in the Transit-Oriented Development Blok M area is 3.0%. This value indicates that the accessibility and completeness of facilities in this area are still not good for users who want to switch modes. The assessment based on user perceptions shows that there are several indicators that need to be improved to achieve an optimal accessibility value.
**Keywords:** *Accessibility, Displacement, TOD Area, MRT Station, Bus Stop, Blok M*

## 1. Introduction

In creating a good urban layout, sustainable transportation system planning is required. A sustainable transportation system must not harm public health or the environment and consistently meet mobility needs. This planning needs to be developed with the concept of Transit Oriented Development (TOD). Transit-Oriented Development (TOD) is a planning approach that aims to create compact and dense communities centered around public transportation hubs. (Prawiratama & Yola, 2023).

According to (ITDP (Insitute for transportation and development Policy), 2017), *Transit-Oriented Development* (TOD) is the development of compact, dense, multi-functional, pedestrian-friendly areas within a half-mile radius of transit stations. TOD generally includes residential, commercial, retail, and recreational areas designed to create linkages/integration between transit, bicycles, and pedestrians. In evaluating high-quality TOD projects, ITDP uses eight principles for better streets and cities, which if implemented will create vibrant, lowemission cities where people are happy and comfortable to live, work, and play.

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
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Successful sustainable cities in the 21st century will prioritize people by integrating transportation systems with urban development. TOD will result in compact and multifunctional areas within a walkable distance from high-capacity transit stations. TOD-based area development always prioritizes streetscapes, pedestrian-oriented building forms, and land use characteristics that are convenient and safe for walking, cycling, and using public transportation. (ITDP (Insitute for transportation and development Policy), 2017).

The Indonesian government through the Ministry of Agrarian Affairs and Spatial Planning has regulated the regulation of transit-oriented areas through the Minister of Agrarian Affairs and Spatial Planning Regulation No. 16 of 2017 concerning Guidelines for the Development of Transit-Oriented Areas. The development of various regulations regarding transit-oriented areas indicates support from the central and local governments for the planning of the transit-oriented area concept. (Gifarry et al., 2022).

In line with this, the DKI Jakarta Provincial Government is developing the TOD concept at several points on the MRT route, one of which is Blok M. The plan for the Blok M area as a TOD area is listed in the DKI Jakarta RDTR. The operation of the MRT in 2019 also encourages the planning of TOD areas in Jakarta, where Blok M is designated as one of the first five TOD areas to be developed by the Jakarta MRT. The technical plan for the Blok M TOD area has been contained in the DKI Jakarta Governor Regulation Number 55 of 2020 concerning Urban Design Guidelines for the Blok M-Sisingamangaraja TOD Area. (Gifarry et al., 2022). The Blok M area in Kebayoran Baru, South Jakarta is an example of TOD implementation in Indonesia, with diverse land uses including offices, trade, services, public facilities, green open spaces, and residential areas. Blok M is known as a vibrant economic and social center, becoming a major destination for offices, entertainment, and shopping. The DKI Jakarta government has developed an integrated public transportation network, including MRT and Transjakarta, with the Blok M BCA MRT Station and Blok M Transjakarta Bus Stop as important transit points.

However, the implementation of TOD in Blok M still faces challenges in transportation mode integration. Although the distance between the two transit points is only about 400 meters, physical accessibility and physical integration have not been perfectly implemented. The lack of integration of public transportation modes in the area means that people prefer to use private vehicles to get to the Blok M area, so congestion in the Blok M area is unavoidable, especially during peak hours In addition, access to public transportation points is still an obstacle such as the mode transfer lane is a mixed lane so there are still activities other than passenger transfer and the lack of clear directions in the area, lack of shade or weather protection along intermodal routes, facilities such as escalators, elevators, and special lanes for people with disabilities or pedestrians are not functioning properly, and public spaces such as parks, commercial areas, or other public facilities that should support intermodal transfer are not well integrated with the transportation network. This also has an impact on people's choice of private vehicles for their

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Advances in Transportation and Logistics Research
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daily activities. This lack of integration and connectivity in the transportation network is the fundamental reason why public transportation in Jakarta is riddled with problems.

In realizing a better Blok M TOD Area, it is necessary to implement the concept of intermodal transportation integration to facilitate accessibility and passenger movement. In order to create good services for service users, each facility must be interrelated in supporting their respective integration such as the integration of facilities and infrastructure so as to create convenience in making transfers, especially at the Blok M BCA MRT Station and Blok M Transjakarta Shelter and vice versa. The research conducted will understand the experiences and perceptions of passengers related to intermodal transfers in Blok M, especially the mode transfer between MRT Blok M BCA and Transjakarta Blok M bus stops. Researchers can explore various factors that affect the comfort and convenience of switching, such as facilities and infrastructure conditions. The main focus of this research is to assess how the physical integration of intermodal transportation in the Blok M TOD area from the perspective or opinion of passengers. The results of the study are expected to provide insights into the physical integration of intermodal between MRT block M BCA and Transjakarta block m bus stop, as well as provide recommendations for the development of better transportation integration in the future.

**Problem Statement**

1. What is the perception of passengers regarding the accessibility of intermodal transfer from Blok M BCA MRT station to Blok M Transjakarta bus stop and vice versa?
2. What are the factors that influence the ease of intermodal transfer for passengers from Blok M BCA MRT station to Blok M Transjakarta bus stop and vice versa?

## 2. Literature review

### Accessibility

In the book "Sistem Transportasi" written by (Nur et al., 2021), Accessibility comes from the word 'access', a translation of the word access, which in English means entrance. Accessibility means things that can be entered or easily reached or achieved (Salasabila, 2021). Accessibility is a measure of the convenience or ease of achieving locations and their relationship with each other, easy or difficult locations. Accessibility can be said to be the ease of getting to a location that will lead to connectivity between places. Accessibility is also an important factor in environmental planning and design, as it can help prevent discrimination against people with disabilities. (Saputro & Kusuma, 2023)

Ease of achievement to a location requires adequate access support in terms of time, comfort, and ease of service. The travel time taken by a person will depend on how accessible the available transportation infrastructure is. Similarly, with access from the Blok M BCA MRT Station to the Blok M Transjakarta Bus Stop or vice versa, the condition (quality) of the portation infrastructure will affect the travel time of a person. In the development of a sustainable transportation system, transportation connectivity is one of the important factors in

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
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the selection of public transportation points. Indicators used to assess transportation connectivity to public transportation points can use Accessibility indicators are indicators of the success of an integrated transportation infrastructure development. There are 3 dimensions to measure accessibility in intermodal integration according to (Sugita et al., 2022) namely: Connectivity; connectivity not only includes spatial relationships within one mode of transportation but also intermodal relationships. For example, how passengers can transfer from MRT to bus or vice versa easily. It also includes safe and convenient pedestrian paths, Integration; includes supporting facilities such as escalators, elevators, dedicated lanes for pedestrians and bicycles, which connect different modes of transportation, Intelligibility; includes clear signage, easy-to-understand information maps, and directions that help users navigate from one mode of transportation to another. This is important to ensure that all users, including people with disabilities, can switch modes easily.

To minimize bottlenecks during intermodal transfers, service integration in intermodal transport is one of the key success factors in its implementation. Integration here aims to coordinate and promote barrier-free and convenient services with high quality. It is important to improve the quality of transit services in order to attract intermodal transit users.

**Transit-Oriented Development**

*Transit-Oriented Development (TOD)* is "a mixed-used community that encourages people to live and work in areas with public transportation facilities and discourages people from driving private cars". (Calthorpe, 1992). TOD development should be mixed-used buildings or buildings that have multiple functions. Train stations, bus terminals, bus stops, or other city transportation points become centers of activity with a high level of activity that will decrease the farther away from the existing city transportation points. The development of Transit Oriented Development has an optimal radius of 400 to 800 meters from the city transportation transit point (train station, bus terminal, bus stop, etc.) into an attractive activity center. By utilizing public transportation, people will be directed to walk or use bicycles, so the application of the TOD concept will greatly affect pedestrian pedestrians and the availability of vehicle parking, especially bicycle parking. TOD is a mixed-use community that encourages people to live near transit services and reduces their dependence on driving (Suryobuwono, 2021). Walking/bicycling around the area can reduce the intensity of private vehicles, when private vehicles are reduced, it will reduce congestion and fuel use, so it will have an impact on reducing pollution from vehicles around the area and creating an environmentally friendly situation.

Based on the Regulation of the Minister of Agrarian and Spatial Planning/BPN No. 16 of 2017 concerning Guidelines for the Development of Transit-Oriented Areas Article 1, the definition of a transit node is a place intended for intermodal and intermodal changes in the form of train stations, terminals, seaports, river and lake ports, and/or airports. (Menteri Agraria dan Tata Ruang/ Kepala Badan Pertahanan Nasional, 2017). So that the Transit-Oriented

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Advances in Transportation and Logistics Research
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Development (TOD) area can be interpreted as an area whose land function consists of various land uses or a mixture that is carefully and carefully designed and planned and there is access to the transit location node that can create a sense of security and comfort. (Zafira & Puspitasari, 2022)

## 3. Research method

### Study Design

This research design uses qualitative research methods to analyze how the accessibility of intermodal movement in the Transit-Oriented Development Blok M area. Informants in this study were selected using non-probability sampling purposive sampling technique, namely the informant criteria are passengers who change modes in the Blok M TOD area, especially from the Blok M BCA MRT station to the Blok M Transjakarta bus stop. The selection of informants is intended so that respondents have direct experience related to intermodal movement in the area. In the research, triangulation of observation techniques, questionnaires, and documentation. Determination of the sample based on Roscoe, the sample size should be 30-500, so this study determined a sample of 72 people. (Sugiyono, 2020) .

**Table 1: Research Indicators**

| Types | Description | Indicator | Value/Size/Amount |
|---|---|---|---|
| Accessibility | | | |
| 1). Connectivity<br><br>2). Integration | 1). Includes spatial relationships within and between modes of transportation.<br>2). Includes supporting facilities that connect various modes of transportation. | 1. Pedestrian Path<br>2. Canopy<br>3.Lighting Lamp<br>4. Lift<br>5. Ramp | 1. Minimum 1.60 – 3.00 meters<br>2. Rain and heat protection on the integration path<br>3. At least 95% and in accordance with technical standards<br>4. Minimum net size of elevator space 140 cm x 140 cm<br>5. Slope should not exceed 6-7° |
| 3). Intelligibility | This includes clear signage, easy-tounderstand information maps, and directions that navigate from one mode of transportation to another. | 1. Wayfinding<br>2. Signage<br>3. Guiding Block | 1. 5 - 10 minutes walking distance between wayfinding<br>2. Directional signage should be installed every 20 - 25 meters<br>3. Placement of guiding blocks in front of vehicle traffic lanes, entrances/exits to and from stairs or crossing facilities with different floor heights, entrances/exits in passenger |

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areas, on pedestrians connecting roads and buildings and directions from public facilities to the nearest public transportation.

Source: (PermenPU30, 2006) and (Forum Diskusi Transportasi Jakarta (FDTJ) & Institute for Transportation and Development Policy (ITDP) Indonesia, 2021)

**Data Analysis Methode**

According to (Sugiyono, 2020) descriptive analysis is research conducted to determine the existence of independent variables, either only one variable or more (stand-alone variables) without making comparisons of the variables themselves and looking for relationships with other variables. Researchers collected data by distributing questionnaires using a Likert scale.

| No. | Alternative Answer | Value Weight |
|---|---|---|
| 1 | Very Good | 5 |
| 2 | Good | 4 |
| 3 | Not So Good | 3 |
| 4 | Not Good | 2 |
| 5 | Very Unfavorable | 1 |

Source: (Prof. Dr. Sugiyono, 2013)

The Likert scale is used to analyze each statement or indicator, which is then calculated the frequency of answers to each category (answer choice) and then summed up. After each indicator has an amount, it is then averaged and then the researcher draws it on a continuum line to find out the category of the average results. Researchers in determining the scale category on a continuum line use the following formula (Fauzy, 2019)

$$\bar{x} = \frac{\sum_{i=1}^{N} Xi}{n}$$

$\bar{x} = mean$

After knowing the average score, the results are entered into a continuum line with the tendency of the respondent's answer will be based on the average score and then categorized on the score vulnerability as follows:

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$$ILS\left(Interval\ Level\ Score\right) = \frac{Highest\ score - \ Lowest\ score}{Number\ of\ answer\ criteria}$$

Description:
Highest Score = 5
Lowest Score = 1

$$\text{NJI} = \frac{5-1}{5} = 0{,}8$$

Based on the results of the above calculations, the table scale categories can be found as follows:

Tabel 2. Scale Categories

| No. | Scale | Value Weight |
|---|---|---|
| 1 | 1,00- 1,80 | Very Unfavorable |
| 2 | 1,81- 2,60 | Not Good |
| 3 | 2,61- 3,40 | Less Good |
| 4 | 3,41-4,20 | Good |
| 5 | 4,21-5,00 | Very Good |

Source : (Sudjana, 2012)

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## 4. Results and discussion

### Result of Accessibility Indikator Assesment Based on Observation

Tabel 3. Indicator Observation Results

| No. | Indicator | Observation Results | |
|---|---|---|---|
| | | Note | Dokumentation |
| 1 | Pedestrian Path | The condition of the pedestrian path is still inadequate because the size that should be 2.85 meters becomes 1.60 meters due to the use of the Pedestrian Path by street vendors for selling places. |   |
| 2 | Canopy | There is no canopy on the pedestrian path, so passengers are still exposed to rainwater when it rains and sunburned when it is hot. |  |

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| | | | |
|---|---|---|---|
| 3 | Lighting Lamp | Lighting conditions on the transfer path from the TransJakarta bus stop to the MRT station are still inadequate, because not all lights are functioning properly. |  |
| 4 | Lift | There is an elevator at only one point with access conditions that are difficult to reach for friends with disabilities. |   |
| 5 | Ramp | Non-strategic placement of ramps on the mode shift path. |  |

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| | | | |
|---|---|---|---|
| 6 | Wayfinding | Not available on the transfer line from the TransJakarta bus stop to the MRT station, unlike the reverse transfer. |  |
| 7 | Signage | The condition and availability of signage is minimal at Blok M Transjakarta Bus Stop and good at Blok M MRT Station. |  <br>  |
| 8 | Guiding Block | Not functioning properly due to the presence of street vendors for selling. |  |

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**Survey Results Based on Indicator Assessment**

The questionnaire used Google Form with a total of 72 respondents. The assessment of Intermodal Transfer Accessibility from respondents can be seen in Table 4.

**Tabel 4. Assessment Based on User Perception**

| No. | Parameters | Average Score |
|---|---|---|
| 1 | Pedestrian Path | 2,25 |
| 2 | Canopy | 2,77 |
| 3 | Lighting Lamp | 4,15 |
| 4 | Lift | 3,20 |
| 5 | Ramp | 2,5 |
| 6 | Wayfinding | 3,4 |
| 7 | Signage | 3,2 |
| 8 | Guiding Block | 3,5 |

Based on the results of the user perception calculation score for the intermodal transfer analysis above, it can be concluded that:

1. The pedestrian path is considered to still need improvement with a score of 2.2, this value indicates that the pedestrian path is not in good condition. The existing pedestrian path is often hampered by the presence of street vendors, especially in the afternoon, as well as the presence of quite a lot of stairs, which are a barrier for users, especially those with limited mobility.
2. Pedestrian support facilities such as canopies are currently considered to be in poor condition, as reflected in the average score of 2.7. On the pedestrian path that is the main link between the two modes of transportation, the absence of a comprehensive canopy results in users being exposed to direct rain or heat, so the improvement or addition of canopies along the path is very necessary.
3. Other supporting facilities on lighting are in good condition with an average score of 4.15. This shows that lighting facilities to meet the needs of mode shift have been done quite well.
4. The availability and condition of the elevator still requires further attention, as shown by the average score of 3.20, this value indicates the availability and condition of the elevator is not good. The management and rearrangement of this elevator needs to be done because passengers feel the size of the elevator is limited which results in often experiencing long queues, and access is less friendly for users with disabilities.
5. Supporting facilities such as ramps are in poor condition, as indicated by the average

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
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score of 2.5. The existing ramps are not always easily accessible or are even covered by street vendors, making their use suboptimal.

6. The availability of wayfinding is still in poor condition. The spacing of wayfinding with an average score of 3.4 indicates that it is not evenly distributed throughout the mode shift area. Existing wayfinding is only available at a few points, and does not adequately cover many important areas.
7. Signage, which has an average score of 3.2, shows that conditions are still not good, as well as wayfinding which is still not evenly distributed throughout the mode transfer area. This lack of maximization of directional information is an obstacle in itself, especially for passengers who are using the Transjakarta Shelter facility for the first time to the MRT Station or vice versa.
8. Other supporting facilities for friends with disabilities (blind), namely guiding blocks, are still considered in poor condition with an average score of 3.5. Especially in the pedestrian path and mode transfer area of the Blok M Transjakarta bus stop.

The results determine that the accessibility of intermodal movement in the TransitOriented Development Blok M area is still in poor condition, where there are facilities that need to be considered again. Pedestrian paths and supporting facilities such as canopies and guiding blocks require significant improvement. The existing pedestrian path is often obstructed by street vendors which causes the transfer to not be seamless, guiding blocks intended for the visually impaired are also not fully functional because they are obstructed by the activities of street vendors, while the absence of canopies along the path exposes users directly to extreme weather, both rain and heat. The lighting on the transfer route is quite good, as there are already lighting lamps although not all lamps are functional. The condition of other supporting facilities such as elevators and ramps is also a special concern, as access is still difficult to reach, especially for people with disabilities, and is often blocked by non-pedestrian activities. The last conclusion is that the availability of wayfinding and signage is considered to be unevenly distributed and unclear, which causes confusion for users, especially those who are using intermodal facilities in the Blok M area for the first time. While the Blok M TOD area highlights the need for improvements, other areas in Jakarta showcase effective intermodal integration. For instance, the KRL Cawang Station, Tranjakarta Cikoko St. Cawang Bus Stop and LRT Cikoko Station can be one example of an area with good mode shift integration in Jakarta. In this location, there are several modes of transportation such as KRL, Transjakarta, and LRT, all of which are connected through intermodal bridges. The presence of this bridge makes it easier for passengers to switch from one mode to another without having to leave the station area, thus increasing travel comfort and efficiency. In addition, the well-integrated facility reduces potential confusion and speeds up transfer times, making it one of the more ideal intermodal transfer points compared to some other locations in Jakarta.

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
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**Passengers' Perceptions of Current Facilities Available From Blok M BCA MRT Station and Blok M Transjakarta Bus Stop**

Most respondents felt that the facilities at the Blok M BCA MRT Station and Blok M Transjakarta Bus Stop were inadequate to facilitate switching modes of transportation. They complained about the lack of facilities such as elevators and escalators, which make transferring difficult, especially for people carrying a lot of luggage, the elderly, or passengers with disabilities. Canopy facilities on pedestrian paths are also needed. In addition, they also have difficulty in finding clear information or directions, which makes switching modes in this area more complicated. Therefore, many felt that switching modes of transportation at this location was not easy. However, there are also a number of passengers who feel that switching modes of transportation in this area is already quite easy, because they are familiar with the area.

**Passengers' Perception of Facilities that Should Be Improved from Blok M BCA MRT Station and Blok M Transjakarta Bus Stop to Facilitate Mode Shift**

Most respondents revealed that to make it easier to change modes from Blok M BCA MRT Station to Blok M Transjakarta Bus Stop, various supporting facilities both physical and informational are needed. Physical facilities needed include elevators, escalators, and pedestrian paths equipped with shade such as canopies to protect passengers from the weather. In addition, information facilities are also very important, such as clear directions and floor plans of the surrounding area so that passengers can easily find the right transfer route. To further improve convenience, special lanes or covered bridges can also be built that directly connect the two modes of transportation, so that transfers can be made more easily and safely.

## 5. Conclusion

Based on the results of the analysis, it can be concluded that the accessibility value of intermodal movement in the Transit-Oriented Development Blok M area is 3.0%. This value indicates that the accessibility and completeness of facilities in this area are still not good for users who want to switch modes. The assessment based on user perceptions shows that there are several indicators that need to be improved to achieve an optimal accessibility value. These include the availability and condition of transfer facilities that are not seamless, the existence of inadequate supporting facilities, and various obstacles such as improper placement of supporting facilities that interfere with the accessibility of intermodal transfer in the Blok M Transit-Oriented Development area. Comparing other examples in Jakarta, such as the KRL Cawang, Transjakarta Cikoko, and LRT Cikoko Station, demonstrates how physical integration can ease intermodal transfers, serving as an ideal model for areas still facing integration challenges like Blok M.

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## 6. Implications

Indicators that still have poor scores need to be improved so that existing facilities are adequate for users. The following are some improvements that can be made to increase the accessibility value in the Blok M Transjakarta Stop area and Blok M MRT Station:nilai aksesibilitas pada area Halte Transjakarta Blok M dan Stasiun MRT Blok M:

1. Obstacles on the pedestrian path such as the presence of street vendors and the lack of supporting facilities such as canopies, lighting, and guiding blocks that are not fully functional must be managed and reorganized to ensure that there are no obstacles that hinder pedestrian activities.
2. Other supporting facilities such as elevators and ramps need to be improved in quality and quantity. Improvements to elevator access and the addition of an elevator at the Blok M Transjakarta bus stop for users with disabilities are needed. Repositioning of ramps and rearrangement of pedestrian areas are also needed to ensure better accessibility, especially for users with disabilities.
3. The addition and more even distribution of wayfinding and signage will help users navigate the transfer area more easily. Improvements to these information facilities will help improve user orientation and ease of switching modes.

## 7. Research limitations

This study has several weaknesses that need to be considered. First, the duration of the study and limited human resources, which limited the ability to conduct a broader and more detailed survey. The methods used in this study, namely observation and questionnaires, also have limitations. Observation only allows researchers to see what is happening at the time, without being able to dig deeper into the facilities for intermodal movement. Questionnaires, while effective in collecting data from many respondents, often only provide a general overview and are unable to capture more complex details.

These limitations mean that the results may not go into enough depth or detail to explain the phenomenon under study. As such, while this study provides a useful starting point, further research with a longer duration and more diverse methods is needed to gain a more thorough understanding.

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