

# Do the Deaf Swimmers Need Assistant Tool When Doing a Swimming Start?

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**Abstract** Not all humans are born in perfect condition and have a complete body, which means that there are still many physical imperfections possessed by certain people so that they became a form of deficiency or disability. One of the persons with disabilities is mentally retarded who has a sensory disability, so that he experiences obstacles or disturbances in his sense of hearing. Deaf children do not have differences in intelligence, but have differences on communication which tends to be visual rather than verbal. This becomes an obstacle for deaf swimmers when competing in swimming. Because during competitions, deaf swimmers often make mistakes by jumping before the whistle is sounded or jumping into the water too late when the whistle is sounded. Thus, the purpose of this study is to determine whether deaf swimmers need a swimming start aid. The research method used is descriptive method with survey technique. The population and samples used are deaf athletes in DKI Jakarta, amounting to 20 people. The research instrument used is a questionnaire to analyze the need for a starting tool for deaf swimmers by having three indicators as a decision maker whether deaf swimmers need a swimming start aid. The data analysis technique used is descriptive analysis technique. The results show that deaf swimmers really need a tool when starting swimming. Therefore, this research is a basic research to be developed further in making swimming start aids for deaf swimmers who are in dire need when they start swimming.

**Keywords** Deaf Swimmer, Assistant Tool, Swimming, Start

## 1. Introduction

Each individual created has its own advantages and disadvantages which are referred to as persons with disabilities. Persons with disabilities are those who have long-term physical, mental, intellectual or sensory limitations and this is an obstacle that can make it difficult for them to participate in society if it is based on equal rights [1]. People with disabilities are divided into several types, namely physical disabilities, sensory disabilities, mental disabilities, and intellectual disabilities. One example of people with disabilities who are included in sensory disabilities is the deaf. Deaf is someone who experiences obstacles or disturbances in the sense of hearing as a means to process information. People who have audiological conditions or are hard of hearing can communicate well using visual rather than verbal communication [2].

Changing people's perceptions about people with disabilities, helping reduce the isolation of people with disabilities and integrating them into people's lives can be done through sports [3]. Sport is an effective tool for changing people's attitudes by acquiring new physical and social skills, self-confidence and positive relationships. Sport also has the power to improve the lives of persons with disabilities, which is reflected in various international agreements, strategies and instruments [4]. Sport has a goal to improve the ability of body functions and to support various body activities in improving the quality of human resources. Likewise, in international development programs, sport is often used as a tool that can provide

social benefits such as empowerment [5], [6], and integration [7]. Sport is also a place to realize human rights, especially the rights of certain groups, such as women or people with disabilities [8]. Likewise, for the deaf, sport serves to assimilate and identify their individual in the sports community [9] to assimilate and identify their individual within the sporting community. Therefore, it is very important to foster and develop sports for people with disabilities, so that they can foster self-confidence, independence and self-esteem [10].

One of the sports that can be done by anyone regardless of gender, age, physical limitations is swimming. Swimming is a sport that trains the whole body with a low impact on the body [11]. Swimming has many benefits such as: having good lung capacity, endurance, flexibility, balance, muscle strength and weight control [12]. To achieve optimal swimming performance, mastery of techniques such as: start technique, swimming technique, reversal and finish technique is required [13]-[15]. One technique that must be mastered is the start. Because in competitive swimming, start is closely related to overall performance [16]. Swimming starts contribute between 0.8 – 26.1% to the total race time depending on the distance traveled, and the percentage contribution will increase as the race distance becomes shorter [17]. This means that the acquisition of time taken by a swimmer to complete his finish in a certain swimming number in a swimming race is influenced by his starting role and ability [18]. This is supported by research conducted by Morais, et al [19] showing that the combination of start and reversal accounted for almost a third of the total race time among the finalists in the 100 m distance at the 2016 European Championship.

Swimming starts are determined from the sound of the start trigger until the swimmer's head passes a point 15 m in the pool, and the start has a significant impact on the total race time [20], [21]. The start trigger is sounded by the starter, and at each swimming pool track, there is a loudspeaker with a function to sound the start sound signaling the start of the race. Thus, every swimmer who competes must be able to listen to the signal or sound given by the starter so that it is not too late to jump into the water and start swimming [22]. However, for a deaf swimmer of course, this becomes a problem, because they have difficulty in receiving verbal communication [23]. Therefore, mastery of swimming start movements is very important for all swimmers, including swimmers with hearing disabilities (deaf).

The participation of deaf athletes in sports has received little attention and most of the literature focuses on deaf children in relation to motor development [24]-[26], balance performance [27], and the ability to learn motor skills [28]. In addition, the literature on deaf athletes involved in sports, especially swimming, is still very limited. Not only that, it is not uncommon for educators to associate sports with not being for deaf children, as they imply that deaf children will somehow be disadvantaged

when they compete in sports [9]. Even though deaf athletes can perform optimally, in order for their achievements to develop quickly, they must be supported from the intelligence aspect that comes from vision and motor skills [29]. Therefore, it is necessary to conduct a study to find out what is needed by deaf swimmers, especially when starting to perform optimally. Based on the background of the problem, the researcher is interested in conducting research on the analysis of the need for starting aids for deaf swimmers.

## 2. Materials and Methods

### 2.1. Research Design and Subject

The purpose of this study is to determine whether deaf swimmers need a start aid when starting in swimming. The research method used is descriptive method with survey technique. The data collection is carried out at the Senen Jakarta swimming pool. The population and samples used are athletes with hearing impairment in DKI Jakarta, totaling 20 people using total sampling.

### 2.2. Research Procedure

The time of the research is in 2022 starting from April - July 2022. The research stage begins by preparing a research instrument in the form of a needs analysis questionnaire, distributing questionnaires to the research population to obtain the required data and then conducting data analysis. The research instrument made refers to 4 indicators of the analysis of the need for swimming start aids, namely: 1) Availability, 2) Suitability, 3) Convenience, and 4) Needs.

Availability indicators contain whether all this time there have been available tools specifically for deaf athletes when starting swimming. The suitability indicator contains whether the equipment currently used is in accordance with the needs of deaf athletes who have hearing impairments. And the convenience indicator contains whether the tools used today are easy to use or easy to use for deaf swimmers when they start swimming in swimming competitions. The last indicator is an indicator of needs containing whether deaf athletes need a tool to start swimming during competitions.

### 2.3. Data Analysis

The data analysis technique used is descriptive analysis technique. Descriptive analysis technique describes the description of variable data consisting of frequency distribution, median, mode, mean, standard deviation, variance, highest and lowest value. After describing the description of the research results, the next step is to provide a discussion related to the research results obtained so that they can be used for the next research step, namely

making a starting device that is intended to help deaf swimmers when starting swimming so that they can achieve optimal performance.

### 3. Results and Discussion

The following are the results of the study that can be concluded based on data collection using a closed questionnaire. The research results are based on the research indicators described above. The results of the distribution of the needs analysis questionnaire can be seen as follows:

**Table 1.** Availability of tools

Description	Frequency	Cumulative Frequency
Very Available	0	0
Available	0	0
Enough	2	10
Not Available	18	90
	20	100

The results of table 1 above show that there is no swimming start tool that matches the characteristics of deaf swimmers as seen in the results of the study, namely that 90% (18 people) stated that they were not available and only 10% (2 people) stated that they were quite available.

**Table 2.** Tool suitability

Description	Frequency	Cumulative Frequency
Very Suitable	0	0
Suitable	0	0
Enough	3	15
Not suitable	17	85
	20	100

The results of table 2 above show that the swimming start equipment used during the competition is not suitable for the characteristics of deaf swimmers who have hearing limitations. This can be seen in the results of the study, namely 85% (17 people) stated that they were not suitable and only 15% (3 people) stated that they were quite appropriate.

**Table 3.** Tool convenience

Description	Frequency	Cumulative Frequency
Very Easy	0	0
Easy	3	15
Enough	5	25
Not Easy	12	60
	20	100

The results of table 3 above show that the swimming

start tool used during the competition is not easy to use considering the limitations of deaf swimmers. They are often late in jumping into the water or ahead of the start signal. This can be seen in the results of the study, namely that 60% (12 people) said it was not easy, 25% (5 people) said it was enough and only 15% (3 people) said it was easy.

**Table 4.** Tool Needs

Description	Frequency	Cumulative Frequency
Very Needed	20	100
Needed	0	0
Enough	0	0
No Needed	0	0
	20	100

The results of table 4 above can be seen that swimming start aids are very much needed by deaf swimmers with the results of the questionnaire showing that 100% are in dire need of swimming start aids. This is because the equipment used today uses sound, which is of course very difficult for deaf swimmers to start swimming while competing. The results of the research above can be used as a basis for making decisions that deaf swimmers really need a swimming start aid during a competition. Because the current starting device has many shortcomings, such as the unavailability of the tool, and it is not easy to use the tool and the device does not match the characteristics of deaf swimmers who have hearing impairments.

Based on the results of the study, it can be seen that deaf swimmers need assistive devices when starting. Deaf swimmers have limitations in terms of hearing, so this makes it difficult for them to start using the current swimming start, which uses the whistle sounded by the starter. Currently the system starts and starts the passage of time in swimming matches using an audible signal or the sound of a whistle with the following signal stages: 'On your mark', 'Set', and 'Go' [19].

The start signals the start of a swimming match or timing system, sometimes with only one LED flashing to give a 'Go' signal. However, deaf swimmers need additional indicators in visual form to provide complete mental and physical readiness by 'On your mark', 'Set', and 'Go'. [30]. In swimming competitions, it is difficult for deaf athletes to participate in, therefore visual cues are needed in the system of competitions such as the start as a sign of the start of the swimming competition and the start of time. Visual cues provided by the system can provide both physical and mental assurance so that the deaf swimmers are ready to compete in swimming [31], [32].

There are several studies that support the importance of assistive devices to help deaf swimmers to be able to start correctly according to the signal given. For example, the Stick Ear research by Yeo et al. [33] features a collection of sound-based sensor nodes by enabling a distributed

network. These sensor nodes convert door knocks into visual signals that can be easily identified by hearing-impaired people. Likewise, Ho-Ching, et al [34] developed two visual displays to provide awareness of environmental sounds, such as telephone rings and knocks for the deaf in the work environment.

Mathews et al [30] have conducted research on peripheral visual displays to help deaf people maintain awareness of sounds in their environment. Meanwhile, Ketabdar et al [35] developed a mobile application to analyze the audio context and issue visual and tactile alerts. This app is designed for the deaf to get notified about audio events happening around them. Matsuda et al. [36] conducted research with the development of luminous devices for the deaf that convert non-speech audio information into visual information as well as provide direction to sound sources using light. Therefore, it is hoped that further research can be done to make a tool for deaf swimmers when starting swimming in order to make it easier for deaf swimmers to start. So that they will not make mistakes such as being too early or too late when the start signal is sounded.

#### 4. Conclusions

Based on the results of the study, it was found that deaf swimmers really need a start aid during swimming matches. This is because they have limitations in terms of hearing which can certainly prevent them from starting swimming so that the resulting time is also less than optimal. Since the current way of starting is to use a human voice or the sound of a whistle, it can be concluded that deaf swimmers need a start aid in a visual form so that they can see when starting. Therefore, it is hoped that further research will be able to make a starting aid in a visual form that can be seen by deaf swimmers when starting in swimming competitions.

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