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Original Article

Interpersonal Communication Training as an Effective Strategy to Optimize Multiple Micronutrient Supplementation (MMS) Utilization in Preventing Maternal and Neonatal Deaths

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ABSTRACT

Background: Maternal mortality remains a global health problem, with approximately 800 deaths every day, mostly due to complications such as bleeding, where severe anemia is a major predisposing factor. Multiple Micronutrient Supplementation (MMS) is now recommended as a substitute for blood supplementation tablets due to its more complete nutritional content. However, utilization of MMS still faces challenges, including low knowledge of pregnant women, negative perceptions of side effects, and misinformation. Education by health workers, especially midwives, is key to overcoming these barriers. Interpersonal communication training is a relevant strategy to improve midwives' ability to deliver information effectively and build positive relationships with pregnant women. Although MMS has begun to be implemented, studies related to the effectiveness of interpersonal communication training in the context of MMS education are still limited in Indonesia. This study aims to fill this gap and strengthen the role of midwives in antenatal care. **Objective:** To assess the effect of interpersonal communication training on the utilization of multiple micronutrient supplementation on midwives' knowledge and skills. **Methods:** This study was conducted in September 2024 in Bone Bolango Regency, Gorontalo Province, involving 74 coordinating midwives and village supervisors. The design used was a quasi-experimental one-group pretest-posttest to evaluate the effectiveness of interpersonal communication training on improving midwives' knowledge and skills. Knowledge was measured using a questionnaire, while skills were assessed through a post-training observation checklist. All instruments were tested for validity and reliability. Data analysis included Wilcoxon test to compare pretest and posttest scores, Spearman test to see the relationship between knowledge and skills, and Mann-Whitney test based on midwives' characteristics. Path analysis was conducted within a Structural Equation Modeling (SEM) framework with directly observed variables. **Results:** The results showed that the score before the intervention was 10.80 and after the intervention was 15.23, which means there is a difference in scores between before and after the intervention. The statistical test results showed a p value (0.000) <0.05, which means that there is an effect of interpersonal communication training in the utilization of multiple micronutrient supplements (MMS) on the knowledge and skills of midwives. **Conclusion:** Interpersonal communication training for midwives is effective in improving midwives' knowledge and skills.

Keywords: Interpersonal Communication, Midwives, Training, Multiple Micronutrient Supplementation, Knowledge, Skills

INTRODUCTION

Maternal mortality remains a global health problem. Every day, an estimated 800 women die, equivalent to one death almost every two minutes[1]. The high maternal mortality rate (MMR) and infant mortality rate (IMR) is one of the indicators that illustrate the country's health status is poor[2]. This is because pregnant women and infants are vulnerable groups that require maximum services[3]. The main complication causing almost 75% of all maternal deaths is bleeding[4]. Severe anemia predisposes death from bleeding and infection[5]. The main cause of anemia among pregnant women is iron deficiency, which accounts for about 63% of all anemia cases. Multiple micronutrient supplementation (MMS) plays an important role in influencing maternal and infant health. The study showed that there are health workers who are able to provide appropriate education considering that pregnant women's trust in health workers is an important factor in supplement utilization[6].

In Indonesia, a micronutrient policy has been implemented for almost 50 years as part of integrated antenatal care, previously called Fe tablets. However, in practice, only 73.2% of pregnant women received Fe tablets, while 26.8% did not. In addition, this data shows that 61.9% of pregnant women took less than 90 Fe tablets during pregnancy, while only 38.1% took more than 90 tablets. This suggests that the iron supplement supplementation program in Indonesia has some weaknesses in terms of availability, implementation, and monitoring[7].

Utilization of MMS often faces barriers due to low knowledge of pregnant women, difficulty remembering, negative perceptions of side effects, or misinformation about supplements[8,9]. Counseling by health workers should provide information on the benefits of MMS and how to manage side effects[10].

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But currently, counseling is often neglected by stakeholders due to low knowledge and skills of health workers, and lack of time is one of the reasons[11]. Therefore, policy makers need to facilitate regular training so that there are health workers who are able to provide appropriate education, considering that the trust of pregnant women in health workers is an important factor in the use of supplements[12].

Interpersonal communication training is an effective strategy to improve midwives' knowledge and skills. Individualized education allows midwives to provide information tailored to the unique needs of each pregnant woman, thereby increasing understanding and acceptance of the importance of MMS[13]. The interpersonal communication training model is designed to be different from other trainings because midwives are able to conduct interpersonal communication individualized education with the model listen, appreciate and clarify. Through this approach, pregnant women are expected to feel appreciated so that the messages conveyed can be better received. In addition, the uniqueness of this study lies in the role of midwives as the main actors who are trained before the intervention of implementing interpersonal communication training on pregnant women.

This research is expected to have a positive impact on improving the quality of maternal and child health services, especially through strengthening the role of midwives in providing interpersonal communication education. By applying the model of listening, appreciation and clarification, midwives can build a more meaningful relationship with pregnant women, which is characterized by openness, empathy and trust. This positive interaction has the potential to encourage mothers to use MMS supplements not because of coercion, but as a form of awareness of the importance of meeting nutritional needs during pregnancy.

METHODS

The population in this study were midwives who worked actively and did not have additional duties at nine health centers in Bone Bolango Regency, Gorontalo Province. The sample was selected using purposive sampling technique, with the consideration that each midwife was responsible for one neighborhood or village. To maintain the quality of intervention implementation, dropout criteria were applied for participants who did not attend the full training. A total of 74 midwives attended the training as assistants in the Interpersonal Communication intervention to support the utilization of Multiple Micronutrient Supplementation (MMS) in pregnant women. The training resource persons came from the Vitamin Angels organization, which has expertise in the field of Interpersonal Communication for the use of MMS in pregnant women. The training was held in three batches, with each batch attended by a maximum of 25 participants. Each batch of training was conducted over two days. The first day was conducted in the classroom and began with a knowledge pretest to measure participants' initial abilities. The training materials were delivered using the andragogy approach, which emphasizes participatory learning through interactive discussions and real practice simulations, thus encouraging participant activeness. The training atmosphere was attractively packaged through various educational games, in order to increase participants' participation and involvement. On the second day, participants carried out field practice in the form of individualized education to pregnant women using the interpersonal communication training approach. During this practice, participants' skills were assessed using a skills assessment checklist by researchers and coordinating midwives who acted as supervisors. The training was closed with an evaluative discussion and the implementation of a knowledge posttest as a final assessment of participants' understanding.

RESULTS

Distribution Map of the Working Area of the Assistance Midwives

Figure 1. Map of the distribution of coordinating midwives and village midwives who have been trained in interpersonal communication training intervention in utilization of multiple micronutrient supplementation (MMS) on the knowledge and skills of midwives.

Respondent Characteristics

The number of respondents in this study were 74 respondents. The characteristics of the research respondents include age, education, occupation, length of service, and marital status, each of which is further explained.

Graph 1. Shows that most respondents are <35 years old (68.9%), have a Diploma 3 education (68.9%), and are civil servants (81.1%). Most respondents had a working period of ≥ 5 years (87.8%), and were married (85.1%).

Univariate Analysis

Univariate analysis that describes each variable studied, based on the results of the study obtained as in the following table.

Table 1 presents the mean age, tenure, pre- and post-intervention knowledge and skills of the participants. The mean age of participants was 35.62 years, with an average tenure of 10.93 years. The knowledge score before the intervention was recorded at 10.80, increasing to 15.23 after the intervention. Meanwhile, the mean score of participants' skills was 32.77.

Graph 2 illustrates the distribution of the proportion of knowledge assessment results on each question before and after the intervention.

Before the intervention, questions that had the highest proportion of score 1 were number 1, 2, 3, 5, 6, 7, 9, 12, 17, and 18. This shows that in these aspects, the respondents' level of understanding was still low before the training. After the intervention, the proportion of score 1 was still found in several questions, namely numbers 1, 2, 3, 4, 5, 6, 7, 9, 10, 12, 14, 15, 17, 18, 19, and 20.

Graph 3. Shows the distribution of midwives' skill assessment results in implementing Interpersonal Communication for individual MMS education after the training, with the highest proportion in score 2 (performed) in almost all statements, except statement number 8.

Bivariate Analysis

Table 2 shows the comparison of knowledge and skill scores based on the length of service of midwives, namely less than 5 years and 5 years or more. Before the intervention, the knowledge score of midwives with a work period < 5 years was 10.36, and for midwives with a work period ≥ 5 years was 10.87. After the intervention, the knowledge score increased to 15.36 for the < 5 years group, and 15.16 for the ≥ 5 years group. The difference in knowledge score between before and after the intervention was 5.00 in the < 5 years working period, and 4.29 in the ≥ 5 years working period. The statistical test results showed that there was no significant difference between the two groups in terms of knowledge and skills (all p values > 0.05).

Table 3. Before the intervention, the knowledge score of civil servant midwives was 10.71, while that of non-civil servant midwives was 11.27. After the intervention, the score increased to 15.22 for civil servants and 15.00 for non-civil servants. The difference in knowledge scores between before and after the intervention was 4.51 for civil servants and 3.73 for non-civil servants. For skill scores, civil servant midwives

Table 1. Mean Age, Working Period, Knowledge and Skills of Midwives

	Mean	SD	Median	Minimum	Maximum
Age	35.62	8.03	34.00	24.00	58.00
Period of Employment	10.93	8.07	10.00	0.00	35.00
Pre Test Knowledge	10.80	2.10	11.00	7.00	15.00
Post Test Knowledge	15.23	1.41	15.00	13.00	18.00
Skills	32.77	2.80	33.00	28.00	39.00

Table 2. Comparison of Knowledge Score Before Intervention, Knowledge After Intervention, Difference in Knowledge Between Before and After, and Skill Score Between Working Period < 5 Years And > 5 Years

	Working Period										p value
	< 5 years					>= 5 years					
	Mean	SD	Median	Minimum	Maximum	Mean	SD	Median	Minimum	Maximum	
Pre Test Knowledge	10.36	1.69	11.00	8.00	13.00	10.87	2.17	11.00	7.00	15.00	0.402
Post Test Knowledge	15.36	1.36	16.00	13.00	17.00	15.16	1.37	15.00	13.00	18.00	0.548
Delta Knowledge	5.00	2.19	5.00	2.00	9.00	4.29	2.20	4.00	0.00	10.00	0.278
Skills	32.82	2.52	34.00	28.00	36.00	32.76	2.87	33.00	28.00	39.00	0.717

*Mann Whitney Test

Table 3. Comparison of Knowledge Score and difference Before and after Intervention

	Staffing										p value
	Civil Servant					Non Civil Servant					
	Mean	SD	Median	Minimum	Maximum	Mean	SD	Median	Minimum	Maximum	
Pre Test Knowledge	10.71	2.17	11.00	7.00	15.00	11.27	1.68	12.00	8.00	13.00	0.333
Post Test Knowledge	15.22	1.36	15.00	13.00	18.00	15.00	1.41	15.00	13.00	18.00	0.473
Delta Knowledge	4.51	2.18	4.00	0.00	10.00	3.73	2.28	3.00	1.00	9.00	0.189
Skills	32.70	2.85	33.00	28.00	39.00	33.18	2.60	34.00	28.00	36.00	0.281

*Mann Whitney Test

Table 4. Comparison of Knowledge Score and difference before and after Intervention Skill Score Between Married and Unmarried

	Married					Unmarried					p value
	Mean	SD	Median	Minimum	Maximum	Mean	SD	Median	Minimum	Maximum	
Pre Test Knowledge	10.68	2.13	11.00	7.00	15.00	11.45	1.86	11.00	8.00	15.00	0.310
Post Test Knowledge	15.10	1.28	15.00	13.00	18.00	15.73	1.74	16.00	13.00	18.00	0.209
Delta Knowledge	4.41	2.23	4.00	0.00	10.00	4.27	2.05	4.00	2.00	8.00	0.836
Skills	32.68	2.88	33.00	28.00	39.00	33.27	2.37	34.00	28.00	36.00	0.291

*Mann Whitney Test

Table 5. Comparison of Knowledge Score Before and After Intervention

	Mean	SD	Median	Minimum	Maximum	p value
Pre Test	10.80	2.10	11.00	7.00	15.00	0.000
Post Test	15.23	1.41	15.00	13.00	18.00	

* Uji Wilcoxon

Table 6. Correlation between Knowledge and Skills

Knowledge	Skills	
	Value of r	p value
Pre Test	0,037	0,755
Post Test	0,394	0.000

Tabel 7. Direct Effects and Indirect Effects

			Estimate	S.E.	C.R.	P	Label
Age	-->	Knowledge	0.081	0.031	0.702	0.483	Direct
Working Period	-->	Knowledge	-0.121	0.030	-1.049	0.294	Direct
Age	-->	Skills	-0.218	0.038	-2.063	0.039	Direct
Working Period	-->	Skills	0.167	0.037	1.576	0.115	Direct
Knowledge	-->	Skills	0.383	0.143	3.601	0.000	Direct
Age --> Knowledge --> Skills			0.031				Indirect
Working Period --> Knowledge --> Skills			-0.046				Indirect

had an average score of 32.70, while non-civil servants had 33.18. Statistical test results showed that there was no significant difference between civil servants and non-civil servants, both in knowledge scores before and after the intervention, the difference in knowledge, and skills (all p> 0.05).

Table 4 shows the comparison of knowledge and skill scores between married and unmarried respondents. Statistical test results showed no significant difference in knowledge scores before and after the intervention, knowledge difference, or skill scores between the two groups (all p values > 0.05).

Table 5. shows the comparison of knowledge scores before and after the intervention. The score increased from 10.80 to 15.23. The statistical test results show a p value = 0.000 (<0.05), which means there is a significant difference and interpersonal communication training in the utilization of MMS has an effect on increasing midwives' knowledge.

Table 6. Shows the correlation between knowledge and skills before and after the intervention. Before the intervention, there was a significant correlation between knowledge and skills (p = 0.000; r = 0.394), with moderate and positive correlation strength. After the intervention, no significant correlation was found (p = 0.755; r = 0.037), with weak and positive correlation strength.

Structural Model of Relationship Between Variables

Table 7 shows that in the direct effect, the relationship between knowledge and skills is statistically significant with a p value of 0.000 (<0.05) and an effect size of 0.383. Meanwhile, the indirect effect is not significant because the estimated value of the indirect path is smaller than the direct effect (Figure 2).

DISCUSSION & CONCLUSION

The results showed that most of the participants were at productive age with sufficient work experience, reflecting readiness to participate in the training. Participants already had sufficient work experience and formal education, strongly indicating readiness to participate in the training[14]. The interpersonal communication training proved effective in increasing participants' knowledge, and was accompanied by improved skills in individualized education related to MMS. This finding confirms that the interpersonal communication training approach can strengthen the capacity of health workers to assist pregnant women in a more structured manner[15].

This is in line with the main objectives of communication: facilitating information exchange and building good interpersonal relationships[16]. Research in developed countries shows that effective communication between providers and clients can improve patient satisfaction and regimen adherence[17,18]. Research by Olde Loohuis et al. (2023) showed that good communication strategies can improve the quality of

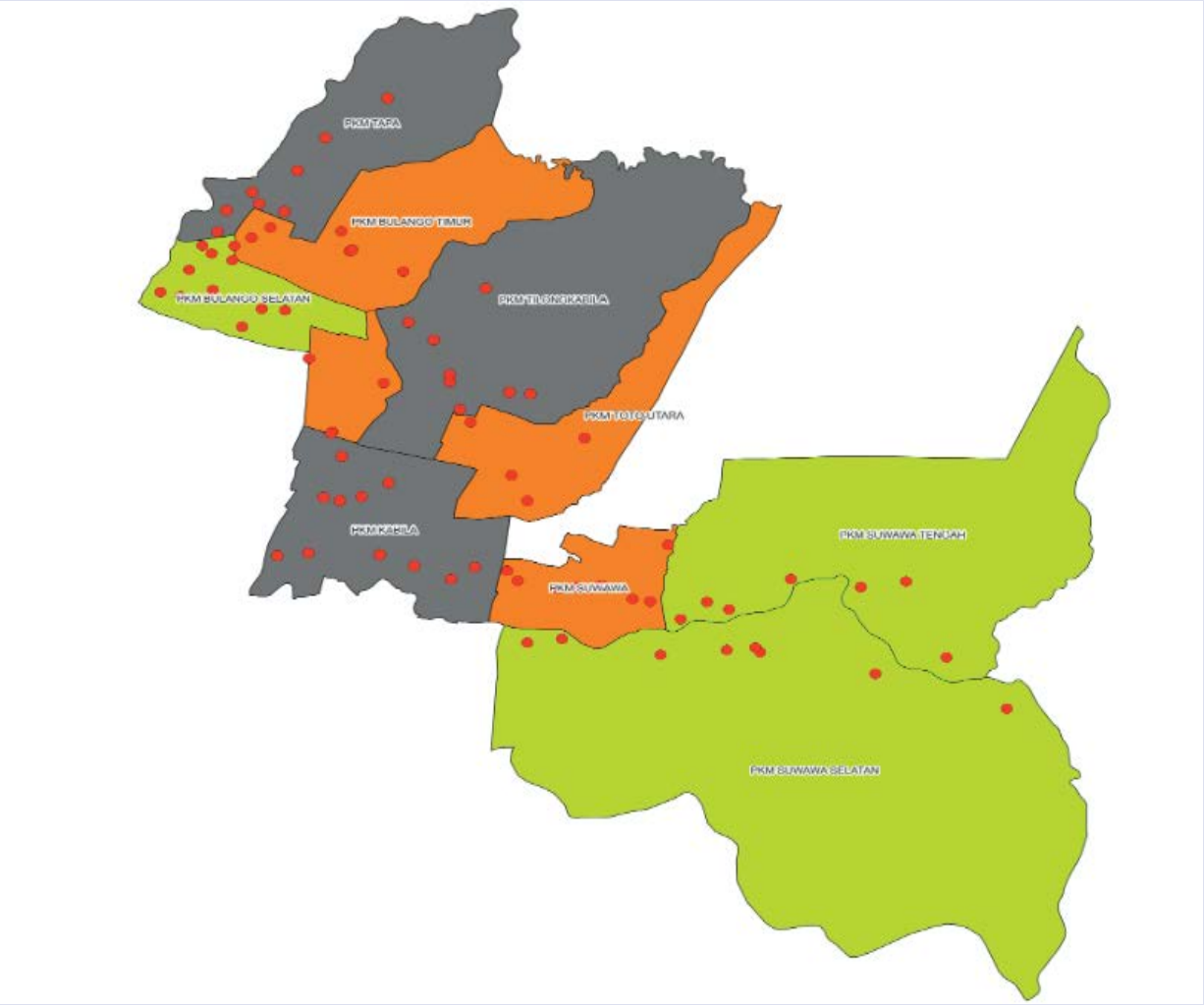


Figure 1. Distribution Map of the Working Area of the Assistance Midwives

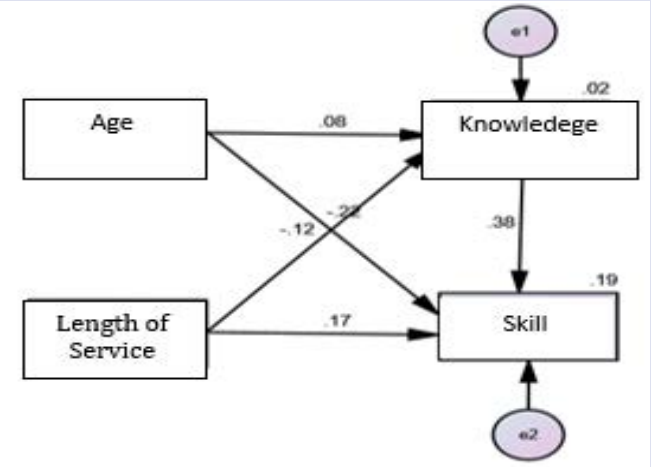
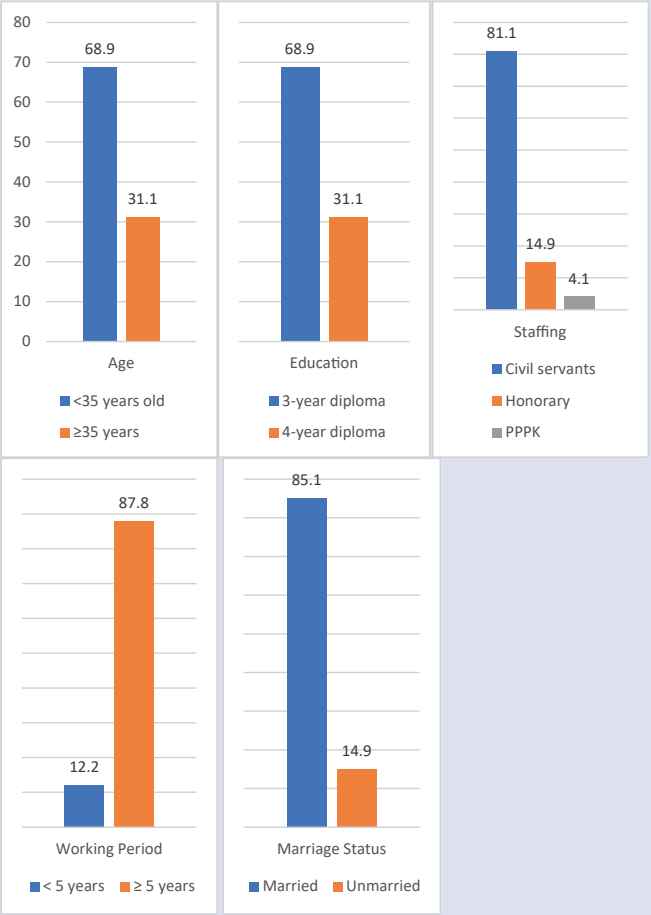


Figure 2. Structural Model of Relationship Between Variables



Graph 1. Distribution of Respondents Based on Characteristics

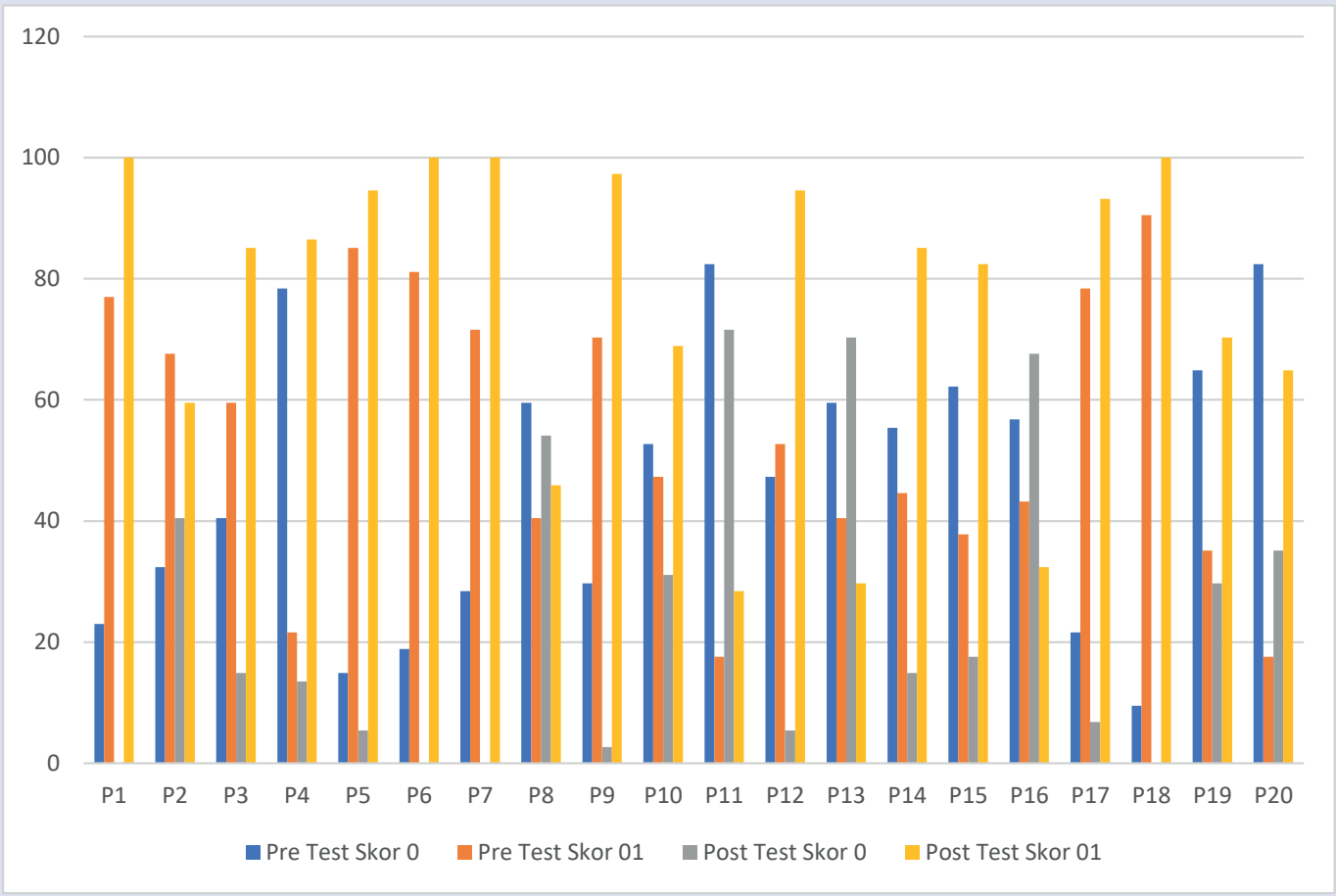
maternal and newborn care through effective information exchange, strong interpersonal relationships, and active participation in decision making[13], as well as by Nursanti, Tayo and Utamidewi (2023), that communication skills such as listening and empathy are essential in supporting maternal and infant health[19]. In addition, in South Africa, it was found that good communication between health workers and mothers can increase mothers' confidence and active participation in their babies' care[20].

However, the distribution of knowledge scores showed that some aspects were still poorly understood despite the improvement in the post-test. In addition, the skills assessment showed that participants' practical abilities were still limited in most indicators. This indicates the need for further reinforcement, especially through repeated practice and direct mentoring in the field. interpersonal communication training increases knowledge but needs repeated reinforcement to achieve deep understanding[21]. In many cases, changes in staff skills still require further guidance and systematic reinforcement[22].

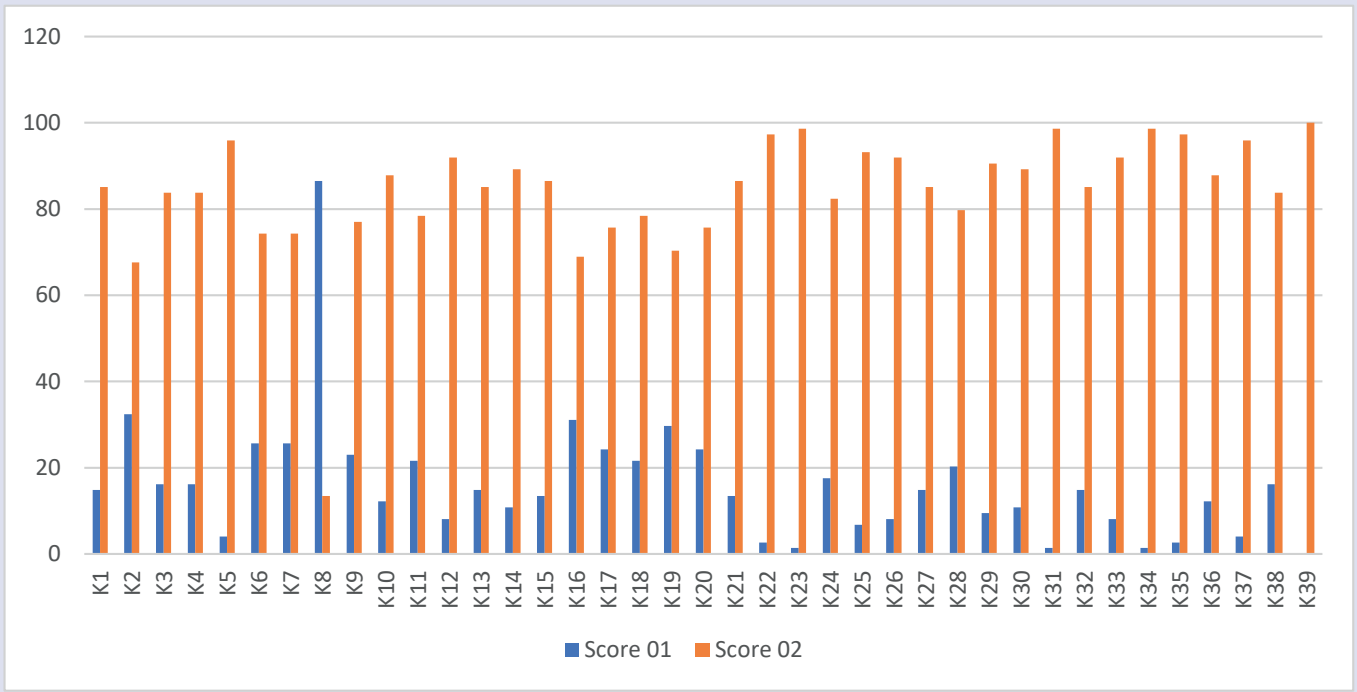
In addition to general training effectiveness, the results of this study show that neither employment status nor marital status has a significant effect on training success. Another study showed that employment status and marital status were not found to have a significant effect on training success[23]. Both civil servant and non-civil servant midwives, as well as married and unmarried midwives, showed an equal increase in knowledge and skills. This finding indicates that the training on interpersonal communication (IEC) in the utilization of multiple micronutrient supplementation (MMS) is inclusive and effective to be applied to participants with diverse individual backgrounds, regardless of personal or administrative status. The training was effective in improving midwives' skills, regardless of participants' personal or administrative status[24]. interpersonal communication training inclusive approach ensures that information is delivered in a way that can be understood and accepted by individuals from different social and professional settings[25].

The results of this study showed that interpersonal communication training in the utilization of multiple micronutrient supplementation (MMS) significantly improved midwives' knowledge. Other studies have shown that the interpersonal communication training approach is effective in increasing the knowledge of participants, in delivering health information to the community[25]. This increase reflects that the training method used was effective in strengthening understanding of the material presented. Adequate knowledge is the main foundation in shaping practical skills, especially in the implementation of individualized education for pregnant women[23]. Effective interpersonal communication between midwives and pregnant women is demonstrated through attitudes such as openness, empathy, positivity, support, and equality. These attitudes contribute to improving pregnant women's understanding of the information conveyed[26]. Therefore, increasing knowledge through interpersonal communication training is a crucial step in improving the quality of communication and education provided by midwives to pregnant women[27].

Before the training, the relationship between midwives' knowledge and skills was quite strong. However, after training, the relationship tended to weaken. This phenomenon indicates that post-training skills may be influenced by other factors beyond knowledge alone, such as practical experience, level of confidence, or support from the work environment. A person who already has certain knowledge, attitudes, and skills that he or she has learned over the years, if the knowledge, attitudes, and actions are something that they do not believe in, it will be difficult for them to accept[28]. Environmental and intrinsic factors influence the skill building process of midwives after training. Environmental factors such as the community's perception of new delivery methods and language barriers are obstacles. Meanwhile, intrinsic factors such as successful experiences, recognition from others, and self-confidence play a role in building midwives' skills[29]. This finding is in line with the understanding that increasing competence is not only determined by cognitive aspects, but also involves affective and psychomotor dimensions. The competency-based learning approach emphasizes the importance of developing practical skills and professional attitudes, not just mastery of theoretical knowledge. Therefore, improving midwives'



Graph 2. Proportion Distribution of Midwife Knowledge Assessment Results



Graph 3. Distribution of the Proportion of Midwife Skills Results

competence requires a holistic approach, which includes a balanced integration of cognitive, affective, and psychomotor aspects[30].

Further analysis showed that the direct effect of knowledge on skills remained significant, reinforcing the important role of knowledge in supporting the improvement of midwives' technical abilities. Knowledge had a significant direct effect on skill acquisition, confirming that mastery of theoretical knowledge is essential for developing technical competence among health professionals. Lack of understanding and application of theoretical knowledge in clinical practice can hinder the development of technical skills. Factors such as lack of confidence, support from mentors, and an unsupportive work environment are major barriers[31]. This finding confirms that knowledge acquisition is one of the crucial components in the formation of professional skills. However, the absence of significant indirect effects indicates that the process of post-training skill acquisition is more complex and not entirely determined by knowledge in a linear fashion. Factors such as participants' attitudes, individual abilities, support from colleagues and superiors, and organizational culture play an important role in the successful transfer of training to clinical practice. Theoretical knowledge alone is not enough; psychosocial factors and the work environment also influence the application of learned skills[32]. This suggests that other factors, such as practical experience, motivation, self-confidence and work environment support contribute to effective and sustainable skill development. This confirms that professional skill development is multidimensional and does not rely solely on cognitive aspects[33].

Overall, interpersonal communication training is proven to be able to increase the capacity of midwives, especially in aspects of knowledge that directly support skills. Interpersonal communication has been widely used in various activities, interpersonal communication can increase group cohesiveness[34,35], increase understanding[36], improve effective communication[37], plays an important role in the communication process[38], affects the increase in self-esteem and self-confidence[39], affects the increase in cooperation[40], effective in carrying out training activities[41], and has a positive impact[42]. However, further strategies that consider practical and sustainable approaches are needed to optimize the transformation of knowledge into skills. Effective implementation of MMS utilization education is needed to prevent adverse pregnancy outcomes[43]. To ensure optimal transformation of knowledge into skills, further strategies are needed in the form of practical and sustainable training that is appropriate to the field situation[44].

A limitation of this study is that it did not explore non-cognitive factors, such as individual motivation, organizational support, or work environment, that could potentially influence the success of knowledge-to-skills. However, in the context of MMS inter-personal training with structured materials and an interactive atmosphere, the training was effective, and another limitation is that although the training showed positive results in the short term, its effectiveness in the context of long-term and real practice still requires further exploration.

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