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The effect of social cognitive theory-based nutrition education via whatsapp on increasing knowledge and behavioral determinants of mothers in Kediri: A quasi-experimental study

pengaruh edukasi gizi berbasis teori kognitif sosial melalui whatsapp terhadap peningkatan pengetahuan dan determinan perilaku ibu di Kediri: Studi kuasi eksperimen

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Abstract

Poor dietary patterns and poor nutritional status increase the risk of morbidity and mortality. Obesity and overweight are major nutritional issues in Kediri. The family environment, particularly the mother's role as a food gatekeeper, is crucial for shaping children's eating habits. This study applies Social Cognitive Theory (SCT), which emphasizes the interaction between individuals, behavior, and the environment. Social media platforms, such as WhatsApp, can be utilized to promote health. This study examined the effect of SCT-based nutrition education via WhatsApp on mothers' knowledge, self-efficacy, self-regulation, family support, and outcome expectations in improving children's dietary intake. A pre-post quasi-experimental design was used with 80 mothers of elementary school children in Kediri City. The intervention group (n=40) received WhatsApp-based nutrition education for 20 days, whereas the control group (n=40) received an e-booklet at the end of the study. Data were analyzed using Spearman's test, Mann-Whitney test, and Wilcoxon Signed Rank test. The results showed that WhatsApp-based nutrition education significantly improved knowledge (p=0,005) and outcome expectations (p=0,039) in the intervention group, whereas no significant effects were observed on self-efficacy and self-regulation. WhatsApp-based nutrition education effectively increased mothers' knowledge and outcome expectations. Future studies should consider the duration of the intervention, including follow-up assessment, refining educational media, combining educational methods, and considering additional SCT components.

Keywords: Behavioral determinants, knowledge, nutrition education, mothers, Social Cognitive Theory, WhatsApp

Abstrak

Pola makan dan status gizi yang buruk meningkatkan risiko kematian dan kesakitan. Obesitas dan overweight menjadi masalah gizi utama di Kota Kediri. Lingkungan keluarga, terutama peran ibu sebagai *food gatekeeper*, berperan penting dalam membentuk kebiasaan makan anak. Penelitian ini menggunakan *Social cognitive theory* (SCT) yang menekankan interaksi individu, perilaku, dan lingkungan. Media sosial seperti WhatsApp dapat dimanfaatkan untuk promosi kesehatan. Penelitian ini bertujuan untuk mengetahui pengaruh edukasi gizi berbasis SCT melalui media WhatsApp terhadap pengetahuan, *self-efficacy, self-regulation*, dukungan keluarga, dan ekspektasi hasil ibu dalam memperbaiki konsumsi makan anak usia sekolah. Desain penelitian menggunakan pre-post quasi-experimental pada 80 ibu anak usia sekolah dasar di Kota Kediri. Kelompok intervensi (n=40) menerima edukasi gizi melalui WhatsApp selama 20 hari, sedangkan kelompok kontrol (n=40) hanya menerima e-booklet pada akhir pertemuan. Analisis data menggunakan uji Spearman, Mann-Whitney, dan Wilcoxon

Signed Rank. Hasil menunjukkan edukasi gizi melalui WhatsApp secara signifikan dapat meningkatkan pengetahuan (p=0,005) dan ekspektasi hasil (p=0,039) pada kelompok intervensi, tetapi tidak ada perbedaan signifikan pada *self-efficacy* dan *self-regulation*. Edukasi gizi melalui WhatsApp efektif meningkatkan pengetahuan dan ekspektasi hasil ibu dalam memperbaiki konsumsi makan anak usia sekolah. Penelitian selanjutnya sebaiknya mempertimbangkan durasi intervensi, menyertakan penilaian tindak lanjut, menyempurnakan media edukasi, menggabungkan metode edukasi, dan mempertimbangkan aspek lain dari SCT.

Kata Kunci: Determinan perilaku, edukasi gizi, ibu, pengetahuan, *social cognitive theory*, WhatsApp

Introduction

The risk of morbidity and mortality is associated with unhealthy dietary patterns and poor nutritional status (Weichselbaum & Buttriss, 2014). Overweight and obesity are significant nutritional issues in Kediri City, with prevalence rates of 15,8% and 12,4%, respectively (Badan Penelitian and Pengembangan Kesehatan, 2019). These nutritional problems indicate that the fulfillment of nutritional needs to support the growth and development of school-aged children has not yet been achieved.

The development of healthy eating habits in children is influenced by the family environment, which is considered to be the most crucial setting (Nepper & Chai, 2016). From birth, the process of food selection is shaped within the family (Aulia & Yuliati, 2018). Parents, particularly mothers, play a significant role in determining food choices as they are the primary food providers (Haryana, 2017). Mothers act as food gatekeepers or primary decision makers regarding household food consumption (Pemjean et al., 2024). Their role is essential in controlling what the family consumes from purchasing and preparing food to serving meals, including restricting unhealthy food at home (Al-Jayyousi and Myers-Bowman 2022; Quick et al. 2018). The dynamic interaction between individuals, behavior, and the environment influences food consumption within families. Therefore, the Social Cognitive Theory (SCT), which emphasizes reciprocal interactions between individuals, their environment, and behavior, is applied in this study (Glanz et al., 2008).

Social media has emerged as a new platform for nutrition research related to eating behavior. An individual's online environment significantly influences their consumption patterns (Folkvord et al., 2020). The use of social media for health promotion has the potential to be widely adopted because of its practicality and effectiveness (Wang et al., 2021).

A survey conducted by the Directorate General of Informatics Applications, Ministry of Communication and Informatics, in collaboration with Katadata Insight Center in 2021, reported that WhatsApp was the most widely used social media platform, with 89,2% of 11,305 respondents across 34 provinces reporting its use (Kusnandar, 2022). Similarly, a survey by the Global Web Index (GWI) in 2019 revealed that 86% of the respondents were WhatsApp users, with 43% of them being parents (Global Web Index, 2019). One study found that parental participation rates were higher when using WhatsApp. However, the use of WhatsApp in healthcare settings has not yet been widely established (Ahmad et al., 2018).

Nutrition education delivered via WhatsApp has been shown to be more effective in influencing behavioral change because the acceptance of information disseminated via WhatsApp is controlled individually (Risti et al., 2021). Education delivered via WhatsApp can significantly improve self-efficacy (Abd El Fatah et al. 2023). A combination of face-to-face education and WhatsApp-based education has been shown to enhance self-efficacy and knowledge, although it does not significantly affect attitudes toward breastfeeding among pregnant women (Mohamad Pilus et al., 2022).

Families play a crucial role in health promotion and rehabilitation, particularly in food consumption among family members (Haryana, 2017). One of the key determinants of healthy meals in a household is the ability to transform commonly purchased foods into healthier options (Reid et al., 2015). Nutrition education provided to mothers has a positive impact on both maternal and child dietary behaviors and habits (Yabancı et al., 2014). Nutrition education can increase maternal knowledge of selecting and preparing appropriate foods, thereby preventing nutritional and health issues in children and their families (Prasetyo et al., 2023). The

provision of nutrition education remains essential, even for working mothers, as they continue to play a role in food selection and preparation within the household (Azria & Husnah, 2016; Shaluhiyah et al., 2020).

Education in the form of short videos of balanced nutrition will be provided to the mothers. Videos may differ in their effectiveness in delivering knowledge depending on the fit between audio and visual content (Marx & König, 2025). Short-form video formats facilitate the quick distribution and easy sharing of nutrition education content, allowing information to be conveyed more efficiently than longer-format videos (D'Souza-Rushton et al., 2025). Short videos have a positive effect on respondents' attitudes towards the content presented (Youn et al., 2024). Videos presented in either animated or talking head formats did not show a significant difference in effect, but participants received better knowledge scores for the topics of the videos they watched (Marx & König, 2025). Based on these considerations, this study aimed to examine the knowledge, self-efficacy, self-regulation, social support, and outcome expectations of the participants before and after receiving a nutrition education intervention. The hypothesis proposed that mothers who received the nutrition education intervention would show significantly higher levels of knowledge and behavioral determinants than the control group.

Methods

This study was conducted using a pre- and post-quasi-experimental design. Site selection was based on the high prevalence of child nutritional problems, particularly overweight (15,8%) and obesity (12,4%) (Badan Penelitian dan Pengembangan Kesehatan, 2019). These figures are higher than both the national and provincial averages for East Java (Badan Penelitian and Pengembangan Kesehatan, 2019; Kementerian Kesehatan Republik Indonesia, 2018). This study was conducted from September to November 2024 at SD Plus Rahmat and SD Negeri Burengan 2 in Kediri City, East Java. Both schools were selected as sample sites as part of the "School for Movement" Program (Kementerian Pendidikan Kebudayaan Riset dan Teknologi Republik Indonesia, 2024). The sample selection for this study was based on the following inclusion criteria: mothers of children aged 9–11 years, using WhatsApp, residing in the same household as their children, and willingness to participate in the study by signing an informed consent form.

This study involved 80 mothers of school-aged children equally divided into a control group (n=40) and a treatment group (n=40). Participants were not informed of their group allocation. The sample size was determined using GPower 3.1 software, based on the difference between two independent groups, according to previous studies (Risti et al., 2021), using the following formula:

$$n = \frac{(r+1)(Z_{\alpha/2} + Z_{1-\beta})^2 \sigma^2}{rd^2}$$

Keterangan:
r: Sample size ratio
σ: Standard deviation
d: Expected score difference between 2 groups
$Z_{\alpha/2}$: Significance level (1,96 for Alpha 5%)
$Z_{1-\beta}$: Test power (85%)

The data collected included subject characteristics (age, occupation, education, and income), nutritional knowledge, and behavioral determinants, which were measured using constructs from Social Cognitive Theory (SCT), including self-efficacy, self-regulation, family social support, and outcome expectations. Data were collected at baseline and the end of nutritional education (endline). Nutritional knowledge and behavioral determinants were assessed using a validated questionnaire (r-calculated>r-table) and tested for reliability, yielding a Cronbach's alpha value greater than 0,8.

The questionnaire consisted of 70 items with the following details: 30 questions on knowledge, 10 questions on self-efficacy, 10 questions on self-regulation, 10 questions on family social support, and 10 questions on expected outcomes. The questionnaire was completed offline, in person, by the subjects using printed forms. The knowledge questions were scored as 1 point for correct answers and 0 points for incorrect answers. The behavioral determinants questionnaire used a Likert scale, with the criteria for the constructs of self-efficacy and expected outcomes being strongly agree (four points), agree (three points), disagree (two points), and strongly disagree (one point). For the constructs of self-regulation and family social support, the Likert scale options were always (four points), often (three points), sometimes (two points), and rarely (one point). These choices were based on frequency references from previous research: always (seven times/week), often (to 5-6

times/week), sometimes (to 3-4 times/week), and rarely (to 1-2 times/week or never). Knowledge and behavioral determinants were divided into three categories. The knowledge categories were as follows: good (>80), moderate (60–80), and poor (<60) (Khomsan 2021). The behavioral determinant categories are classified as positive (>80), neutral (60–80), or negative (<60) (Khomsan, 2021).

Nutritional interventions were performed for > 20 days. The treatment group received education via WhatsApp for more than 20 days (4 weeks). The education included short videos, 1–2 min in duration, on balanced nutrition, covering five main topics: balanced nutrition and carbohydrates, vegetables and fruits, animal and plant proteins, nutritious breakfast, sugar, salt, and fat. These topics were repeated four times, adjusted to the objectives of each week's session based on the SCT constructs. The first week aimed to build self-efficacy, the second week focused on enhancing self-regulation, the fourth week aimed to encourage family social support, and the final week sought to improve mothers' expected outcomes. Every two weeks, in-depth video materials were provided to the mothers of school-aged children. The control group was given an e-booklet at the end of the educational sessions.

Data analysis was performed using IBM SPSS version 26. Descriptive analysis was conducted for subject characteristics, while inferential analysis employed the Kolmogorov-Smirnov normality test, Spearman Rank correlation test, Mann-Whitney test for differences between the two treatment groups, and Wilcoxon Signed Rank test for differences before and after the intervention. This study was approved by the Health Research Ethics Committee of the Faculty of Dentistry, Airlangga University (approval number 788/HRECC). FODM/VII/2024.

Result and Discussion

The characteristics of mothers of school-aged children in both groups observed in this study included age, education, occupation, and income (Table 1). Age was categorized into three tertiles based on statistical data distribution. Educational attainment was initially divided into five levels; however, the data distribution was observed in only three categories. Occupation was classified into five categories, whereas income was divided into three categories based on the minimum wage (UMR) of Kediri. The minimum wage of Kediri City in 2024 was IDR2.415.362 (Keputusan Gubernur Jawa Timur Nomor 188/656/KPTS/013/2023 Tentang Upah Minimum Kabupaten/Kota Di Jawa Timur Tahun 2024, 2023).

Table 1. Distribution of characteristics of mothers of school-aged children in the control and intervention groups

Characteristics	Control Group (N=40)		Inter-vention Group (N=40)	
	n	%	n	%
Age				
≤37 years	9	22,5	20	50,0
38 – 42 years	22	55,0	12	30,0
≥43 years	9	22,5	8	20,0
Highest Education Level				
JHS/equivalent	0	0,0	3	7,5
SHS/equivalent	5	12,5	15	37,5
Higher education	35	87,5	22	55,0
Occupation				
Unem-ployed/housewife	18	45,0	21	52,5
Entrepreneur	4	10,0	6	150
Civil servant/ mili-tary/police/SOE/ROE	10	25,0	5	12,5
Private employee	5	12,5	7	17,5
Others	3	7,5	1	2,5
Income				
<Minimum Wage (UMR)	16	40,0	25	62,5
UMR – 2xUMR	16	40,0	6	15,0
≥2xUMR	8	20,0	9	22,5

Most participants were aged between 38 and 42 years. This age range falls within the adult and productive age groups in Indonesia (Badan Pusat Statistik, 2024; Peraturan Menteri Kesehatan Republik Indonesia Nomor 25 Tahun 2016 Tentang Rencana Aksi Nasional Kesehatan Lanjut Usia Tahun 2016-2019, 2016). The majority of participants had completed higher education.

Most participants had an income below the minimum wage in Kediri. The mothers' income was predominantly below the minimum wage, as most of them were homemakers. Mothers play the role of food gatekeepers in most households (Pemjean et al., 2024). The distribution of the participants' categories for knowledge and behavioral

determinants (self-efficacy, self-regulation, family social support, and outcome expectations) is detailed in Table 2.

Table 2. Distribution of maternal knowledge and behavioral determinant categories based on the SCT constructs

Variable	Baseline		Endline	
	n(%)	p-value[a]	n(%)	p-value[a]
Knowledge				
Control				
Good	37 (92,5)		39 (97,5)	
Moderate	2 (5,0)		1 (2,4)	
Poor	1 (2,5)		0 (0,0)	
Median (IQR)	96,7 (93,3 – 100,0)	0,008*	96,7 (93,3 – 100,0)	0,089
Intervention				
Good	32 (80,0)		36 (90,0)	
Moderate	7 (17,5)		4 (10,0)	
Poor	1 (2,5)		0 (0,0)	
Median (IQR)	93,3 (84,2 – 96,7)		96,7 (90,8 – 100,0)	
Self-efficacy				
Control				
Positive	21 (52,5)		22 (55,0)	
Neutral	13 (32,5)		16 (40,0)	
Negative	6 (15,0)		2 (5,0)	
Median (IQR)	87,5 (75,0 – 100,0)	0,657	87,5 (75,0 – 100,0)	0,586
Intervention				
Positive	17 (42,5)		20 (50,0)	
Neutral	22 (55,0)		20 (50,0)	
Negative	1 (2,5)		0 (0,0)	
Median (IQR)	77,1 (75,0 – 95,8)		81,3 (75,0 – 95,8)	
Self-regulation				
Control				
Positive	12 (30,3)		19 (47,5)	
Neutral	18 (45,0)		20 (50,0)	
Negative	10 (25,0)		1 (2,5)	
Median (IQR)	75,0 (60,4 – 83,3)	0,145	79,2 (70,8 – 91,7)	0,720
Intervention				
Positive	16 (40,0)		16 (40,0)	
Neutral	18 (45,0)		20 (50,0)	
Negative	6 (15,0)		4 (10,0)	
Median (IQR)	79,2 (75,0 – 86,5)		75,0 (75,0 – 87,5)	
Family social support				
Control				
Positive	13 (32,5)		15 (37,5)	
Neutral	21 (52,5)		22 (55,0)	
Negative	6 (15,0)		3 (7,5)	
Median (IQR)	75,0 (66,7 – 86,5)	0,754	75 (71,8 – 94,8)	0,705
Intervention				
Positive	15 (37,5)		14 (35,0)	
Neutral	15 (37,5)		18 (45,0)	
Negative	10 (25,0)		8 (20,0)	
Median (IQR)	75,0 (60,4 – 87,5)		77,1 (70,8 – 90,7)	
Outcome Expectations				
Control				
Positive	30 (75,0)		33 (82,5)	
Neutral	5 (12,5)	0,146	6 (15,0)	0,053
Negative	5 (12,5)		1 (2,5)	
Median (IQR)	100,0 (79,2 – 100,0)		100,0 (88,5 – 100,0)	

Intervention		
Positive	26 (65,0)	31 (77,5)
Neutral	13 (32,5)	9 (22,5)
Negative	1 (2,5)	0 (0,0)
Median (IQR)	91,7 (75,0 – 100,0)	95,8 (84,4 – 100,0)

* Significant at p-value ≤0,05; [a]Mann Whitney

The increase in the knowledge and behavioral determinants, as described in Table 2, predominantly shifted towards the categories of good knowledge and positive behavioral determinants. Participants' knowledge, self-efficacy, self-regulation, family social support, and outcome expectations generally improved after the intervention. In the intervention group, there was a 12,5% increase in participants with good knowledge, 17,6% increase in positive self-efficacy, no change in self-regulation, 6,7% decrease in positive family support, and 19,2% increase in positive outcome expectations. Most participants experienced improvements in their knowledge and behavioral determinants after the intervention. The trend of the median changes between the groups from baseline to endline is shown in Figure 1.

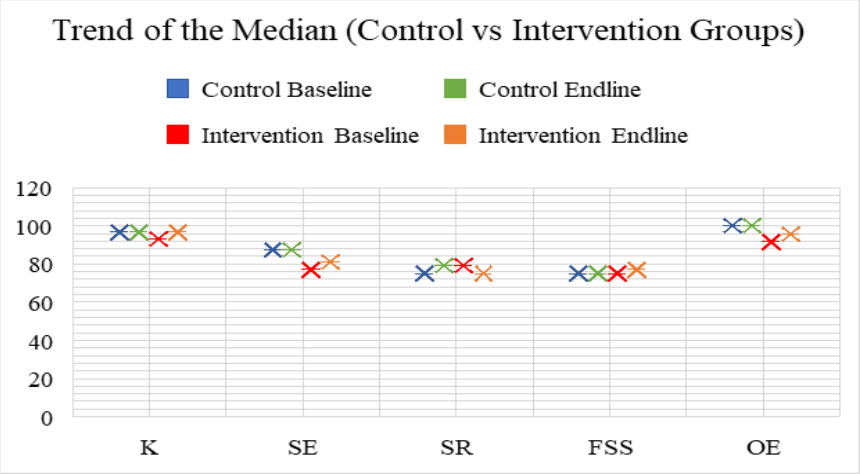

Figure 1. Trend of the median between groups *K, knowledge; SE, self-efficacy; SR, self-regulation; FSS, family social support; OE, outcome expectations.

By contrast, in the control group, the increase in good knowledge was only 5,4%, positive self-efficacy increased by 9,5%, positive self-regulation increased by 58,3%, positive family support increased by 15,4%, and positive outcome expectations increased by 10%. The median scores for nearly all constructs in the final data collection (endline) were higher than those in the initial data collection (baseline) were. However, a decrease in the median value is observed for the self-regulation construct. The median values of the control group at the end line were higher across all variables than those of the intervention group. Table 3 details the differences in knowledge and behavioral determinants between the groups after the intervention, presented as score differences.

Table 3. Differences in knowledge and behavioral determinants between the control and intervention groups before and after the intervention

Variable	Endline-Baseline Difference (Δ)		Z	p-value[b]
	Median	IQR		
Knowledge				
Control	0,0	0,0 – 1,0	0,784	0,262
Intervention	1,0	0,0 – 2,8	2,793	0,005*
Self-efficacy				
Control	0,0	-4,2 – 10,4	1,386	0,248
Intervention	0,0	0,0 – 4,3	0,700	0,484
Self-regulation				

Control	4,2	-4,2 – 18,8	2,583	0,009*
Intervention	0,0	-4,2 – 12,5	0,635	0,525
Family social support				
Control	0,0	-4,2 – 16,7	1,817	0,044*
Intervention	4,2	-7,3 – 12,5	1,183	0,237
Outcome expectations				
Control	0,0	0,0 – 8,3	1,726	0,100
Intervention	0,0	0,0 – 7,3	2,059	0,039*

**Significant at p-value ≤005; [b]Wilcoxon signed-rank test*

The nutrition education intervention group showed a significant difference (p = 0,005). Balanced nutrition education delivered through WhatsApp using video media resulted in differences between the pre- and post-intervention values in the intervention group. This finding aligns with previous studies that demonstrated significant differences in nutrition studies conducted using WhatsApp (Risti et al. 2021). Another study found that nutrition interventions delivered through WhatsApp led to significant improvement in nutritional knowledge (Nadimin et al., 2019).

This increase in knowledge was directly associated with the provision of education. A significant difference was observed in the intervention group, with an increase of 2,793 points compared to baseline data. A systematic review found that providing nutrition education increased a mother's nutritional knowledge, enabling her to make better food choices and prevent nutritional problems in her children (Prasetyo et al., 2023). Mothers' knowledge significantly influences the quality of caregiving practices, which are crucial for optimal child development (Nabilah, 2021; Al Rahmad & Shavira, 2024)). An individual's behavior, derived from stored nutritional knowledge, serves as a primary reference for making food-related decisions (Heryanda & Khoiriyah, 2024). A significant improvement in knowledge is also linked to a more effective reception of information when delivered using audiovisual media (images and sound) (Azhari & Fayasari, 2020).

Self-efficacy in both groups did not differ significantly before and after intervention. Self-efficacy alone does not guarantee success without adequate skills. Self-efficacy, as described by social cognitive theory, is influenced by behavioral factors (e.g., task completion), action results (e.g., perceived goal progress and achievement), and social/environmental input (e.g., social comparison and feedback) (Schunk & DiBenedetto, 2021). The lack of direct maternal experience in this study likely contributed to the absence of significant changes in self-efficacy as the intervention did not include practical skill development training. Moreover, limited opportunities for skill demonstration, guided practice, and constructive feedback further constrain improvements in self-efficacy.

Bandura posits that self-efficacy influences all aspects of behavior and plays a crucial role in behavioral change (Hilliard et al., 2018). Self-efficacy does not develop spontaneously but is constructed through various sources of information that individuals rely on to evaluate their self-perceptions. These sources include mastery experiences, observational learning (vicarious experiences), social persuasion, and physiological indices (Schunk & DiBenedetto, 2021). Self-efficacy and outcome expectations are key psychological determinants (Glanz et al. 2008). Although no significant difference was found, there was a shift in the self-efficacy categories, with a 17,6% increase in positive behavioral determinants in the intervention group, and the median value increased from 77,1 (75,0 – 95,8) to 81,3 (75,0 – 95,8).

Self-regulation, which refers to the ability to manage oneself, has a substantial influence on behavioral change (Glanz et al., 2008; Hilliard et al., 2018). This construct relates to a mother's ability to regulate herself by providing balanced nutrition to herself and her family, particularly her children. Another study indicated that a mother's autonomous motivation is positively associated with creating a healthy eating environment, involving children in food selection and preparation, monitoring food intake, and modeling healthy eating habits (Carbonneau et al., 2023; Al Rahmad et al., 2024). Autonomous motivation shares similarities with self-regulation as it involves willingness, self-determination, and individual choice (Carbonneau et al., 2023).

A key factor supporting self-regulation is family support, which can increase mothers' parenting attitudes and behaviors (Hastuti et al.,

2024). Social support from family members is a crucial factor that influences maternal childcare practices (Nugraha et al., 2019). Family support includes efforts to encourage and assist individuals to achieve self-regulation (Glanz et al., 2008). This finding was also evident in the present study. The significant relationships between self-regulation and social support are shown in Table 4.

Table 4. Relationship between self-regulation and family social support

Value	Control Group (n=40)	Intervention Group (n=40)
p-value[c]	0,000*	0,003*

*Significant at p ≤0,05; [c]Spearman's correlation

In the intervention group, family support declined in facilitating the mothers' ability to regulate themselves by providing balanced nutrition to improve their children's dietary intake. Positive self-regulation did not increase because the mothers' surrounding environment did not support positive behavioral changes (Glanz et al., 2008). Family support serves as a protective factor against overweight and obesity because families influence the dietary intake of household members, particularly children (Delbosq et al. 2022). In the control group, a significant difference was observed between the pre- and post-intervention data. This finding is also related to an increase in family support, which shifts toward a more positive behavioral determinant. The range of values increased, with the initial median and interquartile range (IQR) being 75,0 (66,7 – 87,5) and rising to 75,0 (72,9 – 93,8) in the final assessment, respectively.

A significant difference was observed between self-regulation and social support in the control group. This result may be associated with the mothers' educational backgrounds, as 87.7% of the mothers in the control group had a higher level of education. Education provides individuals with opportunities to access information, increase their skills, improve problem-solving abilities, increase employment prospects, and ultimately grant access to other resources (Nugraha et al., 2019).

Outcome expectation reflects an individual's belief in the expected results and perceived value of a particular behavior (Glanz et al., 2008). A significant difference in outcome expectations was observed in the intervention group, which was related to the changes in maternal beliefs. Mothers' belief that improving their children's dietary intake can help prevent nutritional problems aligns with their outcome expectations. Outcome expectations represent a key motivational process, as individuals are more likely to initiate and sustain behaviors when they believe that their actions will lead to desirable results (Schunk & DiBenedetto, 2021).

An increase in outcome expectations is expected to generate greater motivation to adopt a healthy eating pattern, thereby improving the dietary intake of school-aged children based on balanced nutritional principles. This aspect is associated with anticipated results and the perceived value of engaging in the desired behavior (Arefi et al., 2022). This study also found significant differences in outcome expectations, knowledge, outcome value, and self-efficacy between groups that received nutrition education based on Social Cognitive Theory (Arefi et al., 2022). A higher level of self-efficacy and favorable outcome expectations encourage individuals to engage in healthy eating behaviors (Anderson et al., 2007). Previous research has found that outcome expectations do not predict changes in self-efficacy; however, self-efficacy can predict changes in outcome expectations (Larsen et al. 2015). Nutritional self-efficacy is unidirectionally associated with outcome expectations in children, suggesting that higher levels of self-efficacy tend to lead to more positive expectations regarding the outcomes of health-related behaviors (Larsen et al., 2015). Even individuals with high self-efficacy may show low motivation if they do not perceive the expected outcomes to be valuable (Schunk & DiBenedetto, 2021). However, when adequate skills are present and other motivational processes are favorable, self-efficacy functions as a critical motivational mechanism that contributes to stronger motivational outcomes (Schunk & DiBenedetto, 2021).

Conclusion

Providing nutrition education through WhatsApp using short video media significantly improved knowledge and outcome expectations. Nutrition education for mothers is essential to increase their behavior and improve family food consumption, particularly for children. WhatsApp-based nutrition education in the form of short videos shows strong potential to influence behavior change.

Future studies should consider the duration of the intervention, including follow-up

assessment, refining the educational media, using a combination of educational methods (such as integrating WhatsApp-based education methods and face-to-face sessions), and incorporating additional aspects of Social Cognitive Theory (such as providing structural support or resources within the subjects' environment to facilitate behavioral change).

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