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Research Article

The Influence of Website-Based Health Information Access Media on Primary Outcomes of Metabolic Syndrome Prevention In ASN Employees

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ABSTRACT

Background : Metabolic syndrome is a condition that can put all people at risk, including workers. It is important to improve health literacy related to the prevention of metabolic syndrome among workers. The association of health literacy on healthy lifestyle modification with a decrease in the prevalence of metabolic syndrome. **Objective**: The purpose of this study was to analyse the effect of website-based health information access media on risk factors (knowledge, self-efficacy, work stress). **Methods** : The type of research used is Quasy Experimental design Nonequivalent Control Group design. The sample in this study were 62 employees from 2 government offices engaged in regional finance & assets and the implementation of the water resources network of South Sulawesi province. This study divided two groups, namely the intervention group, which received education through the 'SAFETY prevent metabolic syndrome' website and daily journal filling, and the control group, which received education with booklets, with both groups measured and monitored for 2 months. **Results** : The 'SAFETY' website-based health literacy model intervention was effective in improving knowledge (p=0.000), self-efficacy (p=0.004), and reducing work stress (p=0.047) in government workers, with the significant reduction in work stress demonstrating the benefits of a technology-based approach in managing stress in the work environment. **Conclusion**: This study was effective in increasing knowledge and self-efficacy and reducing work stress. Future research is recommended to expand the website intervention programme with interactive modules, explore integrated self-efficacy enhancement methods, and develop specific stress management programmes with a multidisciplinary approach.

Keywords: Metabolic Syndrome, Health Literacy, Employee, Website, Booklet.

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INTRODUCTION

Metabolic syndrome (SM) is a collection of risk factors for various non-communicable diseases (NCDs) that pose a health threat to developed and developing countries[1]. Data from the World Health Organization (WHO), shows that NCDs are the leading cause of death worldwide, causing an estimated 41 million (71%) of the 57 million global deaths, and cardiovascular disease contributes 17.9 million (44%) to NCD deaths[2]. The prevalence of metabolic syndrome in Indonesia was found to be 21.66% in accordance with the estimated global metabolic syndrome prevalence of 20-25% by the International Diabetes Federation (IDF)[3,4]. People with metabolic syndrome have a two-fold higher risk of developing cardiovascular disease compared to those without the condition and have a five-fold greater risk of developing diabetes[5,6].

The government has implemented various strategic approaches, including increased promotive and preventive efforts, smoke-free zones, GERMAS, and multisectoral programmes such as PIS-PK and Posbindu PTM, to reduce the prevalence of metabolic syndrome[7].

Metabolic syndrome is a condition that can put all people at risk, including workers. Exposure to risk factors for metabolic syndrome can be influenced by workplace characteristics, where workers spend most of their day[8]. Research from the International Labour Organization (ILO) shows that cardiovascular disease is one of the Occupational Diseases that can cause death in workers, with metabolic syndrome as one of the risk factors[9].

The impact of metabolic syndrome on the working population is a serious concern, both directly (medical and pharmaceutical costs due to illness) and indirectly (short-term disability absence costs), the estimated annual health cost of a worker with metabolic syndrome is 3.66 times that of a healthy worker[10].

Metabolic syndrome is one of the health problems that has a high prevalence among State Civil Apparatus (ASN) employees. This is supported by an increase in the prevalence of metabolic syndrome markers based on job characteristics, where the highest proportion is found in the population who work as civil servants / military / TNI / BUMN / BUMD, as can be seen in Figure 1.

Metabolic syndrome in employees can arise due to modern lifestyles or unhealthy habits, such as the routine of sittin in front of a computer for a long time without moving much, which is often experienced by office workers[11]. The work environment has various health risks that can adversely affect workers[12]. Public health centres, in particular, are places that have significant potential hazards. These hazards come

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from various sources, including human resources such as medical staff, patients, patient companions, visitors, and also the community living around the facility[13].

The importance of improving health literacy related to the prevention of metabolic syndrome in productive age groups, especially among workers, becomes clear from the above explanation. Health Literacy (HL) refers to a person's ability to obtain, understand, and use information and knowledge to maintain and improve the health of themselves and others[14]. Low HL is a risk factor for the development of metabolic syndrome[15]. Previous research studies revealed the association of health literacy on healthy lifestyle modifications with a reduced prevalence of metabolic syndrome[16-19].

Improving Health Literacy (HL) can be done through various educational media, both conventional and digital, which are in line with current technological developments[20]. A website-based health promotion programme for people with metabolic syndrome is effective in increasing adherence to lifestyle changes, reducing waist circumference, and increasing High-Density Lipoprotein Cholesterol (HDL-C), two markers of metabolic syndrome[21]. For this reason, the use of literacy media in the form of digital technology media is the right choice for workers. Providing health education or information using digital technology such as mobile phone applications and social media (WhatsApp or Telegram) based on HBM applications can be integrated with HL in promoting preventive health problem behaviour[22].

Research conducted on informal sector workers in Makassar city proved that low health literacy affects the risk of cardiovascular disease[23]. This underlies the need for interventions to improve health literacy in workers so that they can independently determine their health status in accordance with the president's vision in the health sector, namely creating healthy, productive, independent and equitable humans[24]. Health literacy can be an option for solving health problems in workers, such as preventing metabolic syndrome.

This study seeks to fill the knowledge gap that exists in the previous literature with a focus on formal sector workers, especially ASN employees. This research uses a multicomponent intervention method with a website-based health information access media approach supported by HBM theory tailored to the context and specific needs of ASN employees.

The purpose of this study was to analyse the effect of website-based health information access media on risk factors (knowledge, self-efficacy, work stress).

MATERIALS AND METHODS

Study Design

The type of research used is Quasy Experimental design Nonequivalent Control Group design.

Participants

Respondents came from 2 government offices engaged in regional finance & assets and the implementation of the South Sulawesi provincial water source network.

The criteria for this research are:

1) Inclusion Criteria

a) Employees who have a maximum of 2 markers of metabolic syndrome in the intervention group and control group areas. Markers of metabolic syndrome are (central obesity; male abdominal circumference ≥ 90 cm, female ≥ 80 cm, Triglycerides ≥ 150 mg/dl, hypertension ≥ 130/85 mmHg, HDL ≤ 40 mg/dl, fasting blood sugar ≥ 100 mg/dl).

b) Willing to be a respondent

2) Exclusion Criteria

a) Employees who participated in the diet programme

b) Female employees who are pregnant

3) Drop Out Criteria

a) Employees who resigned from becoming research subjects

b) Employees who did not participate in the education session activities

c) Employees were not present at the time of the post test

Sample Size

Based on the calculation of the sample size formula using a standard alpha value of 95% (1.96), a standard beta value of 90% (1.28), and a population standard deviation from previous research of 5.69 (Park and Hwang, 2024), the total sample size needed is 58 people. This sample is divided into two groups, namely the intervention group using website-based health information access media as many as 29 people, and the control group using booklet-based health information access media as many as 29 people. To anticipate the possibility of participants leaving the study, 10% of the existing sample was added, namely each group plus 3 people. Thus, the total sample size was 62 people.

Procedure

Employees were selected based on the research criteria and included in the study. Employees who agreed to participate were given an explanation sheet about the study as well as a consent form to sign.

Intervention

Employees selected as the sample were given informed consent to express their willingness to participate in the study. Before the intervention, a pre-test was conducted by filling out a questionnaire to measure knowledge, self-efficacy, and job stress. The selected samples were then divided into intervention and control groups. The intervention group was given an education session in the form of counselling and media website 'SAFETY to prevent metabolic syndrome', while the control group was given counselling using a booklet to prevent metabolic syndrome. The intervention was given for 2 months. The implementation of the intervention was carried out as follows: (1) The researcher examined the employees by measuring their weight and height to determine their Body Mass Index (BMI), and measured markers of metabolic syndrome such as abdominal circumference, blood pressure, total cholesterol, and fasting blood sugar. Employees who fulfilled the study inclusion criteria were then assigned as the sample. Before the measurements were taken, employees were told to fast for at least 8 hours.

Measurements were taken over 2 days (1 day for the intervention group, 1 day for the control group). (2) The intervention group received education sessions for one month. (3) Before the intervention group received education through the website media, respondents were given an explanation of the media and how to use it. This was done in one day. (4) The intervention group received education through the website by filling out a daily journal available on the website every day for one month. Respondents filled in a daily journal about the food consumed every day, physical activities performed, and how the employees managed their work stress. (5) The control group received education using booklet media for two months (1 month of education sessions and 1 month of daily journal filling without monitoring).

An overview of the website-based health information access media 'SAFETY prevent metabolic syndrome can be seen in Figure 1. The menu on the Website "SAFETY" prevent metabolic syndrome consists

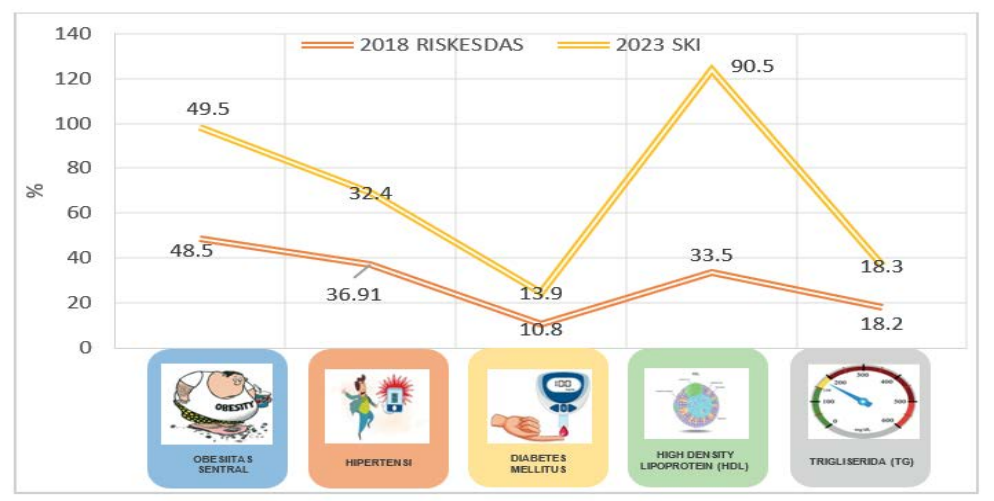

Figure 1. Percentage of metabolic syndrome markers in civil servants / military / TNI / BUMN / BUMD.

of several sections, namely; homepage, metabolic syndrome, IMT calculator, daily journal and about the author.

Study Outcomes

Karakteristik demografis dan klinis dinilai pada awal penelitian. Semua hasil diukur pada awal dan setelah intervensi. Hasil utama yang diukur adalah pengetahuan, efikasi diri dan stres kerja.

Primary outcomes

a. Knowledge

The knowledge variable in this study was measured using 10 questions. Based on the results of the knowledge questionnaire validity test, all question items show r count> r table and sig.<0.05, it can be concluded that all questions on all instruments are valid. Meanwhile, from the reliability test results, the Cronbach's Alpha value (0.745)> 0.6 means that the knowledge instrument in this study is reliable or suitable for use.

b. Self Efficacy

The self efficacy variable in this study was measured using 15 questions. Based on the results of the knowledge questionnaire validity test, all question items show r count> r table and sig.<0.05, it can be concluded that all questions on all instruments are valid. Meanwhile, from the reliability test results, the Cronbach's Alpha value (0.884)> 0.6 means that the self efficacy instrument in this study is reliable or suitable for use.

c. Work Stress

Work stress variables in this study were measured using 10 questions. Based on the results of the validity test of the knowledge questionnaire, all question items show r count> r table and sig value <0.05, it can be concluded that all questions on all instruments are valid. Meanwhile, from the reliability test results, the Cronbach's Alpha value (0.807)> 0.6 means that the work stress instrument in this study is reliable or suitable for use.

Quality Control

The purpose of quality control is to supervise all aspects involved in the implementation of the research process, from the preparation stage to the data processing stage. The steps taken were as follows: 1) Standardisation of field staff. Field officers who assisted researchers were standardised through a common perception of the procedures for conducting the research. For the standardisation of assistants, researchers involved health workers who were competent in measuring abdominal circumference, blood pressure, total cholesterol, and blood sugar. 2) Standardisation of methods and measuring instruments. Measuring instruments were standardised by adjusting their position to a normal state before use, such as weight scales, microtoise, digital tension, and blood sugar measuring devices. For questionnaires, standardisation was done through a pilot test of the questionnaire before the study was conducted. 3) Standardisation of intervention media. The intervention media was standardised by controlling the hosting and monitoring the website through a smartphone using software so that when the intervention was carried out, the website could be accessed properly by respondents. 4) Field trial. Field trials were conducted on respondents outside the research area, as evidenced by documentation of the trials.

Statistical Analysis

Data were analysed using the computer program SPSS, (version 24.0 for Windows; IBM SPSS Statistics). Data analysis in this study was descriptive analysis and inferential analysis. (1) Univariate analysis. Univariate analysis was used to describe the distribution of respondents' characteristics, which included: age, gender, education level, work duration, as well as research variables such as: knowledge, self-efficacy, work stress, diet, and metabolic syndrome parameters. (2) Bivariate analysis. The Kolmogorov-Smirnov test was used to evaluate the normality of numerical data of variables such as knowledge, self efficacy, work stress, abdominal circumference, systolic blood pressure, and total cholesterol. If the data were normally distributed, further analysis used the Independent Sample t test. For variables such as knowledge, diastolic blood pressure, and fasting blood sugar that were not normally distributed, the Mann-Whitney test was used. To compare differences between groups, Paired sample t test was used for normally distributed data, while Wilcoxon Signed Ranks test was used for non-normally distributed data.

Ethical Considerations

The ethics of this study apply principles derived from the Guidelines and Ethical Standards for Health Research and Development issued by the National Commission on Health Research Ethics (KNEPK) in 2017. There are three general principles that have been agreed upon and recognised in health research, namely the principle of respect for persons, the principle of beneficence and non-maleficence, and the principle of justice. This research has obtained an Ethics

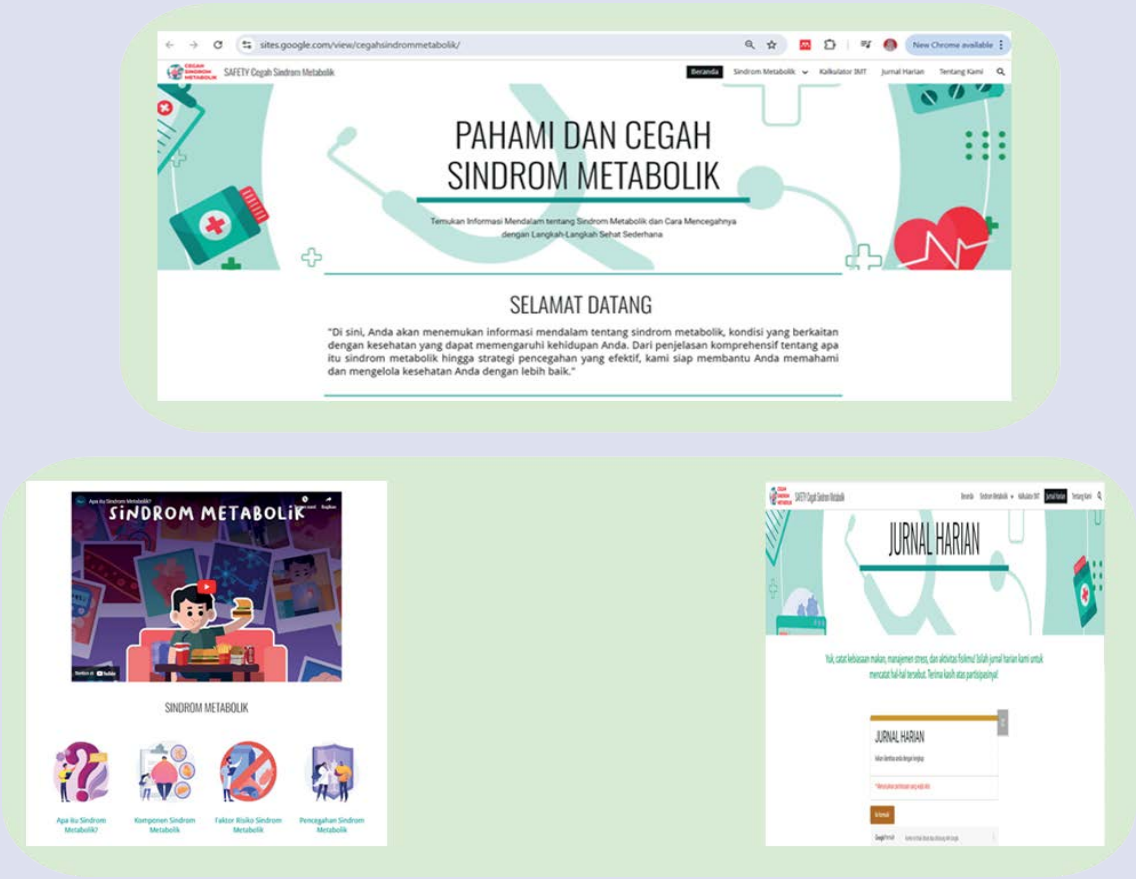

Figure 2. Screen capture of the website.

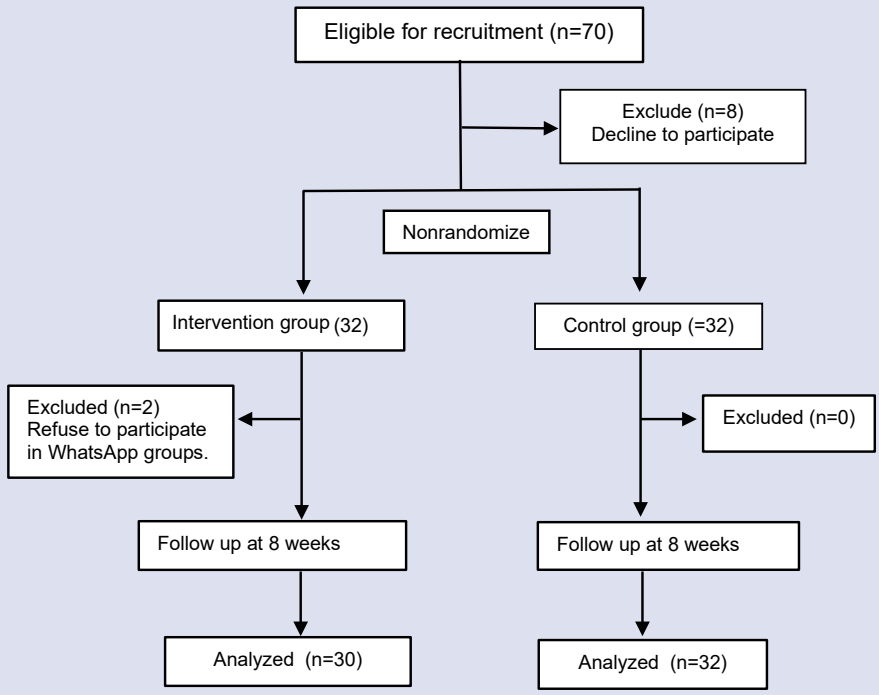

Figure 3. Research Flow Chart.

recommendation letter from the Faculty of Public Health, Hasanuddin University with letter number: Number: 841/UN4.14.1/TP.01.02/2024

RESULTS

This study involved 70 ASN employees who met the sample inclusion criteria. The intervention group consisted of 32 respondents, and the control group consisted of 32 respondents. During the 8-week observation period, 2 respondents refused to participate in WhatsApp group monitoring, so the number of samples analysed in the intervention group became 30 respondents. Whereas in the control group, all respondents were willing to participate until the end of the research activities, so the number of samples analysed in the control group remained at 32 respondents. The flowchart of this study is shown in Figure 3.

The majority of respondents were in the age range of 24-35 years, as many as 63.3% of the total respondents. The gender distribution of respondents was almost balanced with 50% being male and 50% being female. Most of the respondents had a tertiary education level, as many as 93.3%, while the remaining 6.7% had secondary education (junior and senior high school). Most respondents had a length of service between 1-12 years, at 73.3%. The demographic characteristics of the respondents are shown in Table 1.

Overall, the data on demographic and anthropometric characteristics of respondents were homogeneously distributed. body weight before intervention with an average value in the intervention group of 63.17 kg and control 62.06 kg with a p value of 0.651> 0.05 which means that the two groups of respondents were homogeneous in terms of body weight before intervention. For height, the average value in the intervention group was 161.63 cm while the control was 160.34 cm with a p value of 0.548 > 0.05, which means that the two groups of respondents were homogeneous in terms of height. Likewise, the mean value of BMI in the intervention group was 23.80 while the control was 23.56 cm with a p value of 0.666 > 0.05, which means that the two groups of respondents were homogeneous in terms of BMI.The results of anthropometric measurements of respondents are shown in Table 2.

In this study, the primary outcomes include knowledge, self-efficacy and job stress. The results of the primary outcomes comparison analysis between the intervention group and the control group are presented in Table 3. In the table, it can be seen that knowledge with the intervention with website-based health information access media 'SAFETY prevent metabolic syndrome' and monitoring via WhatsApp showed a greater increase (2.50) compared to the control group's knowledge (0.91). There was a highly significant difference between the two groups after the intervention (p = 0.000). Based on the table above, it can be concluded that there is a significant increase in knowledge after the intervention in both groups at p = 0.000. However, this increase was greater in the intervention group. The mean difference in knowledge scores between the intervention groups showed that the intervention group with the SAFETY website media to prevent metabolic syndrome by being monitored using the WhatsApp group had the greatest mean difference before and after compared to the control group. With a greater mean difference, the researcher assumes that education with the website is monitored via the WhatsApp group because ASN employees in their daily lives interact with communication via WhatsApp and find it easier to access health information digitally compared to conventionally using paper because it will interfere with the focus of employees who will blend in with their work.

The significant increase in knowledge in the intervention group compared to the control group is also in line with findings from a study showing that the use of technology-based educational media can be more effective than conventional methods in improving understanding of health[25]. Compared to conventional educational methods, technology-based interventions also provide flexibility in information delivery. Mobile app-based interventions can provide timely and

Table 1. Demographic characteristics.

Characteristics	Group				
	Intervention		Control		p
	(n = 30)	%	(n=32)	%	
Age					
24 - 35	19	63,3%	12	37,5%	
36 - 47	7	23,3%	13	40,6%	0,064*
48 - 59	4	13,4%	7	21,9%	
Gender					
Man	15	50,0%	18	56,3%	0,812*
Women	15	50,0%	14	43,8%	
Education					
Intermediate (Junior & Senior High School)	2	6,7%	8	25%	0,134*
Higher Education	28	93,3	24	75%	
Length of Service (years)					
1-12	22	73,3%	20	62,5%	
13-24	5	16,7%	8	25%	0,062*
25-32	3	10,0%	4	12,5%	

ujii chi-square

Table 2. Anthropometric Measurements.

Group					
Characteristics	Intervention (n=30)		Control	(n=32)	p
	Mean ± SD		Mean ± SD		
Body Weight	63,17	10,05	62,06	9,06	0,651*
Body Height	161,63	8,47	160,34	8,34	0,548*
BMI	23,80	2,20	23,56	2,10	0,666*

**Independent Sampel t test*

Table 3. Analysis of Differences in Primary Outcomes Value of Research Variables Before and After Getting Treatment in each group as well as between intervention groups and control groups.

Variabel		Kelompok		p
		Intervensi (n=30)	Kontrol (n=32)	
		Mean ± SD	Mean ± SD	
Pengetahuan	Pre- test	4,77 ± 0,90	5,06 ± 0,91	0.173[b]
	Post- test	7,27 ± 0,98	5,97 ± 0,90	0.000[b]
p		0.000[d]	0.000[d]	
Self Efficacy	Pre- test	38,97 ± 6,20	41,16 ± 7,37	0.212[a]
	Post- test	42,50 ± 5,01	43,34 ± 6,61	0.575[a]
p		0.004[c]	0.002[c]	
Stres Kerja	Pre- test	25.57 ± 6.19	24.09 ± 6.96	0.206[b]
	Post- test	23.50 ± 4.65	26.31 ± 6.02	0.045[a]
p		0.047[c]	0.016[c]	

Sumber : Data Primer 2024
[a]*Independent sampel t test* [c]*Paired sampel t test*
[b]*Uji Mann Whitney* [d]*Uji Wilcoxon signed ranks*

relevant information, and allow for continuous content updates[26]. These advantages may contribute to a more significant increase in knowledge in the intervention group compared to the control group.

Another primary outcome is self efficacy. There was an increase in self efficacy after the intervention in both groups. The table shows that self efficacy with the intervention of educational sessions, the website 'SAFETY prevent metabolic syndrome' and monitoring by WhatsApp showed a greater increase (3.53) compared to the control group's self efficacy (2.19). There was no significant difference between the two groups after the intervention (p = 0.575). Based on the table above, it can be concluded that there is a significant increase in self efficacy in both groups after the intervention in the intervention group at p = 0.004. in the control group, at p = 0.002.

Self-efficacy, or a person's belief in their ability to carry out the actions needed to achieve certain goals, self-efficacy affects the way individuals think, feel, and act[27]. The results of a study conducted[28], explained that high self-efficacy was significantly associated with healthy dietary behaviour and regular physical activity in individuals at risk of metabolic syndrome. In addition, research[29] showed the importance of continuous monitoring through digital platforms in improving self-efficacy. The study explained that interventions that include monitoring through social media or instant messaging applications, such as WhatsApp, can provide participants with ongoing emotional and social support, which in turn increases their self-efficacy. This can be used as a reason why the use of websites is more effective in increasing employees' self-efficacy.

This study shows that a technology-based educational approach can significantly improve self-efficacy in metabolic syndrome prevention. The integration of Health Belief Model theory in intervention design provides an effective framework for understanding and improving employees' self-efficacy, which can ultimately lead to better health behaviours.

Self-efficacy is an important component of the Health Belief Model (HBM) theory. HBM identifies self-efficacy as an individual's belief that they have the ability to take the necessary actions to prevent or manage illness. In the context of this study, increased self-efficacy means that participants feel more capable and confident to adopt healthy behaviours that can prevent metabolic syndrome. According to research the higher an individual's e-Health literacy, the consolidation and reinforcement of health knowledge, the formation of strong self-efficacy, and ultimately encourages changes to a healthy lifestyle[30].

The application of HBM in this intervention involves four main constructs: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers, with the addition of self-efficacy. Interventions using the "SAFETY cegah gejala rusak" website and WhatsApp monitoring provide information that strengthens perceptions of the susceptibility and severity of metabolic syndrome, as well as the benefits of preventive measures. With increased self-efficacy, individuals are more likely to overcome the barriers they face in adopting healthy behaviors. The study also shows in table 3, there was a decrease in work stress after the intervention in the intervention group but not in the control group. The table shows that work stress with the educational intervention of the "SAFETY cegah gejala rusak" website with WhatsApp monitoring showed a decrease (-2.07) while in the control group there was an increase in work stress, namely (2.22). Based on the table above, it can be concluded that there was a decrease in work stress after the intervention in the intervention group and it was significant (p value = 0.047). while in the control group, the p value = 0.016 also showed a significant change.

Job stress is defined as a physical and emotional response when there is a mismatch between work and the abilities, resources or needs of workers that can lead to decreased health and even injury[31]. High levels of workload are associated with high levels of job stress[32]. Based on the results of the study, it showed a significant decrease in the level of job stress in the intervention group after website-based education and WhatsApp monitoring. While the control group experienced an increase in the average stress score. Comparison of changes in the average job stress score between the two groups showed a significant difference, with the intervention group experiencing a decrease, while the control group experienced an increase. This shows that not only is the intervention effective in reducing job stress, but also that without intervention, job stress tends to increase. These results support the importance of digital-based interventions in managing stress in the workplace.

These findings are in line with previous studies showing that technology-based interventions, such as digital health programs, can effectively reduce work stress and improve psychological well-being among workers. A study found that a digital intervention designed for stress management significantly reduced symptoms of workplace stress[33]. In addition, a study[34] also found that a web-based digital health program had a positive impact on workers' mental health by reducing work stress levels. The decrease in work stress in the intervention group could be attributed to the increase in health literacy resulting from website-based education and WhatsApp monitoring. Good health literacy can improve individuals' understanding of the importance of maintaining health, reducing risk factors for metabolic syndrome, and managing stress more effectively. This is in line with previous studies showing that health literacy interventions can improve psychological well-being and reduce work stress levels[35]

The decrease in work stress in the intervention group can be attributed to the increase in health literacy resulting from website-based education and WhatsApp monitoring. Good health literacy can improve individuals' understanding of the importance of maintaining health, reducing risk factors for metabolic syndrome, and managing stress more effectively. This is in line with previous studies showing that health literacy interventions can improve psychological well-being and reduce work stress levels[35]. The results of a study[36]. which carried out 8 weeks of education sessions on work stress management and monitoring for up to 12 weeks showed high effectiveness in reducing work stress in health workers in Denmark. In contrast, in the Specific Non-Vertical Unit for the Implementation of Water Source Networks, the intervention with booklets did not achieve the expected results in reducing work stress. This was due to the scheduling of the intervention coinciding with a busy period, employees were involved in intensive project supervision. This situation increased the workload and pressure felt by employees, reducing the effectiveness of education through booklets that provided less direct support or workload reduction. As a result, the increase in work stress that occurs in Certain Non-Vertical Units has a negative impact on health, including increasing the risk of metabolic syndrome, because the intervention is not enough to balance the increase in work pressure experienced by employees during the period. Research suggests that interventions using booklets to reduce work stress may be less effective when delivered during busy periods with high workloads. This could be due to the additional pressure experienced by employees, which makes them focus more on immediate tasks and reduce their attention to the educational material being delivered. Several studies have suggested that interventions in the workplace are often less effective when delivered at inappropriate times, such as when employees are involved in intensive projects or when workloads are very high[37-47].

LIMITATIONS

This study shows that the SAFETY website-based health literacy model intervention is effective in increasing knowledge about metabolic syndrome and reducing work stress among government employees. However, there are several limitations that need to be considered. One of the main limitations is the study design that used a pre-post approach without time series data. This approach limits the ability to evaluate changes that occur gradually over time and may ignore dynamics that may affect intervention outcomes. In addition, although the average self-efficacy was higher in the intervention group, this difference was not statistically significant, indicating that the intervention effect in increasing self-efficacy was not strong enough or consistent enough to produce a significant difference. Other limitations include the absence of an in-depth analysis of specific factors that may influence work stress reduction, such as individual intervention components or ongoing support. These limitations imply that further research with a more comprehensive design and more detailed analysis is needed to evaluate the long-term effectiveness of this technology-based approach in the context of mental and behavioral health.

CONCLUSION

The intervention of health literacy model based on safety website is effective in increasing self-efficacy, reducing work stress. This study shows that educational intervention significantly increases knowledge about metabolic syndrome among government workers. This increase is important to encourage behavioral changes that can reduce the risk of metabolic syndrome and improve the overall health of workers. The average change in self-efficacy was higher in the intervention group compared to the control group, but this difference was not statistically significant. This indicates that the intervention has the potential to increase self-efficacy, but the effect is not strong enough to show a significant difference. There was a decrease in work stress after the intervention in the intervention group and was significant, while in the control group, it also showed a significant change. The significant decrease in work stress in the intervention group shows the potential benefits of a technology-based approach and ongoing support in managing stress in the workplace.

RECOMMENDATIONS FOR FURTHER RESEARCH

To improve knowledge, self-efficacy, and reduce work stress among government workers, it is recommended that further research focus on several aspects. First, website-based intervention programs such as "SAFETY" can be expanded by adding interactive modules and more personalized content to deepen understanding of metabolic syndrome and further enhance knowledge. Second, to improve self-efficacy, research should explore more integrated methods, such as practical skills training and ongoing support that can facilitate the formation of healthy habits more effectively. Third, in terms of stress management, research needs to develop and test more specific and adaptive programs, considering various individual factors such as age, gender, and job position, and involving a multidisciplinary approach with collaboration between mental health experts, nutritionists, and physical trainers to achieve more comprehensive and effective results.

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