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Health Literacy to Prevent Obesity in High School Students, Phatthalung Province, Thailand

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Abstract

Background: Childhood and adolescent overweight and obesity are global health concerns. Preventing these conditions—especially among at-risk populations—is more effective and cost-efficient than treatment. One promising approach is enhancing health literacy, which can lead to improved health outcomes. The objectives of this study were to examine the current situation and explore the associations between various factors and health literacy in relation to obesity prevention.

Methods: This cross-sectional study was conducted among high school students in southern Thailand. A total of 572 students from four schools participated, using a self-administered structured questionnaire. Descriptive statistics were employed to summarize sociodemographic characteristics, lifestyle behaviors, and health literacy related to obesity prevention. Logistic regression analysis was used to examine the associations between these variables.

Results: The majority of participants were female (73.3%) and most were aged 17 years (37.2%). Most students demonstrated a moderate level of health literacy regarding obesity prevention (65.4%), while 31.5% had a low level and only 3.1% achieved a high level. Significant associations were found between health literacy levels and several variables, including parental education, parental occupation, BMI-for-age, stress management behavior, sugar-sweetened beverage (SSB) consumption, alcohol use, and internet usage.

Conclusion: Health literacy interventions should be adapted to students' real-life contexts and actively involve families and communities, particularly in rural areas.

Keywords: Health Literacy, Obesity, High School Student, Thailand

Introduction

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health[1]. Globally, more than 340 million children and adolescents aged 5–19 years are overweight or obese, and the prevalence has increased dramatically

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in recent decades. This rise has occurred similarly among both boys and girls. Overweight and obesity are associated with more deaths worldwide than underweight and are present in all regions, including sub-Saharan Africa and Asia[1].

Thai people aged 15 years and older rank fifth in obesity prevalence in the Asia-Pacific region[2]. More than four million individuals are considered at-risk, with a high prevalence of overweight. The incidence rate has been found to increase at younger ages, and the annual healthcare cost for individuals with diabetes in Thailand continues to rise each year[3]. In Thailand, numerous studies and treatment programs for overweight and obesity have been conducted across all regions, aligned with the Ministry of Public Health's policy known as the "Thailand Healthy Lifestyle Strategy," which focuses on reducing health risk factors. Phatthalung Province, located in the southern part of Thailand, has a long history dating back to prehistoric times[4]. Over the past decade, rapid growth in the local economy, driven by tourism and changing lifestyles in both rural and urban populations, has contributed to shifts in health behaviors. According to the 2015 Annual Report from the Phatthalung Provincial Health Center, 8.77% of children in the province were classified as overweight or obese. Although this figure did not exceed the official threshold of 10%, the prevalence has shown a continuous upward trend[5]. This is consistent with reports indicating a rising prevalence of overweight and obesity among individuals aged 15 years and older in the province[6].

Preventing overweight and obesity among individuals and at-risk groups is more effective and cost-efficient than treatment, particularly as healthcare costs continue to rise with the increasing number of patients. Prevention efforts should focus on factors that influence health outcomes, such as lifestyle behaviors associated with body weight, body mass index (BMI), and blood sugar levels. One important approach to improving health outcomes is through health education—specifically by enhancing health literacy. Health literacy broadly refers to an individual's ability to "gain access to, understand, and use information in ways that promote and maintain good health" for themselves, their families, and their communities[7]. According to Don Nutbeam, health literacy comprises three dimensions: functional, communicative, and critical health literacy[8]. The Department of Health, Ministry of Public Health Thailand defines health literacy as an individual's capacity to access health information, evaluate it, make informed decisions to modify behaviors, and select appropriate health services and products. This definition includes six components: Accessibility, Understanding, Inquiry/ Exchange, Decision-Making, Behavior Change, and Communication[9]. The objectives of this study were twofold: (1) to assess the current situation regarding health literacy for obesity prevention and risk behaviors among high school students in Phatthalung Province, Thailand, and (2) to examine the associations between various factors and health literacy related to obesity prevention.

Methods

Study Area and Population

This cross-sectional study was conducted between September 2019 and January 2020 using a multistage sampling technique. The study population consisted of high school students enrolled in Grades 10 to 12 in Phatthalung Province, Thailand. According to the Secondary Educational Service Area Office 12, Phatthalung Province is divided into four educational service zones for secondary schools, classified by location and school size. In each zone, one school with the highest student population was purposively selected. Following school selection, the researcher and research assistants screened students to determine eligibility based on the inclusion criteria and proceeded with data collection. The sample size was calculated using Krejcie and Morgan's formula[10] with a 95% confidence interval, resulting in a required sample of 572 students from the four selected schools. Participants were students aged 15 to 18 years, currently enrolled in high school, able to communicate in Thai, and willing to participate in the study. Students who did not receive parental consent were excluded from participation.

Research Instruments

A self-administered structured questionnaire was used as the research instrument. The questionnaire consisted of eight sections, as follows: Part I: Sociodemographic characteristics. Part II: Health Literacy in Preventing Obesity, (1) Knowledge and understanding of health information related to obesity prevention (2) Accessibility of health information and health services (3) Communication skills for enhancing health expertise (4) Management of health conditions to prevent obesity (5) Media and information literacy for obesity prevention and (6) Decision-making and appropriate health actions. Part III: Lifestyle factors. The questionnaire was adapted from tools developed by the Ministry of Public Health and Srinakharinwirot University[11,12].

Study procedure and Data Collection

The study procedures and methods were reviewed and approved by the Ethics Review Committee for Research Involving Human Research Participants, Health Sciences Group, Chulalongkorn University (COA No. 177/2019), on 9 July 2019. Participants were selected based on predefined inclusion criteria. Data were collected using self-administered questionnaires, which took approximately 30–60 minutes to complete. In addition, physiological assessments were conducted by trained research assistants.

Data Analysis

Data were analyzed using SPSS version 22.0 (licensed by Chulalongkorn University). Descriptive statistics were used to summarize sociodemographic characteristics, lifestyle behaviors, and health literacy related to obesity prevention. The data were presented as frequency, percentage, mean, minimum, maximum, and standard deviation (SD). Binary logistic regression analysis was performed to assess the association between independent variables and health literacy for obesity prevention. A p-value ≤ 0.05 was considered statistically significant.

Table 1: Sociodemographic characteristics of participants (N = 572)

Sociodemographic characteristics	Frequency	Percentage (%)
Grade		
4	168	29.3
5	160	28.0
6	244	42.7
Gender		
Male	153	26.7
Female	419	73.3
Age (years)		
15	116	20.3
16	129	22.6
17	213	37.2
18	114	19.9
Religion		
Buddhism	507	88.6
Christian	1	0.2
Islam	64	11.2

Sociodemographic characteristics	Frequency	Percentage (%)
Grad report		
Excellent	17	3
Good	312	54.5
Moderate	229	40
Not good	14	2.5
Sufficiency of income		
Sufficiency and saving money	281	49.2
Sufficiency and no saving money	222	38.8
Not sufficient but no debt	63	11
Not sufficient and debt	6	1
Parent's Marital status		
Married and live together	433	75.7
Married and not live together	20	3.5
Widow	33	5.8
Divorce/Separate	86	15.0
Parent's Education level		
Uneducated	1	0.2
Primary School	121	21.2
Secondary School	74	12.9
High school	167	29.2
Diploma	63	11.0
Bachelor degree	119	20.8
Master degree and higher	27	4.7
Parent's Occupational		
Agriculture	244	42.7
Contractors	66	11.5
Business/ Self-employed	129	22.6
Government service/ State enterprise	102	17.8
Factory worker	8	1.4
Employee	19	3.3
Unemployed	4	0.7
Family health history of obesity		
Father	74	12.9
Mother	116	20.3
Grandfather	21	3.7
Grandmother	24	4.2
Brother/ Sister	28	4.9
No obesity	186	32.5
More than two	123	21.5

Table 2: Health literacy levels for obesity prevention among high school students in Phatthalung Province, Thailand (N = 572)

Health literacy level / Variable	Frequency	Percentage (%)
Level of health literacy to prevent obesity		
Low (<60%)	180	31.5
Moderate (60–79%)	374	65.4
High (≥80%)	18	3.1
Functional Health Literacy to prevent obesity (1 + 2)		
Low (<60%)	97	17.0
Moderate (60–79%)	405	70.8
High (≥80%)	70	12.2
Communicative Health Literacy to prevent obesity (3 + 4)		
Low (<60%)	259	45.3
Moderate (60–79%)	286	50.0
High (≥80%)	27	4.7
Critical Health Literacy to prevent obesity (5 + 6)		
Low (<60%)	174	30.5
Moderate (60–79%)	328	57.3
High (≥80%)	70	12.2
(1) Knowledge and Understanding in Health Information for Prevent Obesity		
Absolutely Correct	249	43.5
Correct	254	44.4
Incorrect	69	12.1
(2) Accessibility of Health Information and Health Services for Prevent Obesity		
Good	101	17.7
Moderate	330	57.7
Poor	141	24.6
(3) Communication enhances Health Expertise for Prevent Obesity		
Good	33	5.8
Moderate	216	37.8
Poor	323	56.4
(4) Management of Health Conditions for Prevent Obesity		
Good	105	18.4
Moderate	309	54.0
Poor	158	27.6

Health literacy level / Variable	Frequency	Percentage (%)
(5) Know the media and information for Prevent Obesity		
Good	137	24.0
Moderate	240	42.0
Poor	195	34.0
(6) Decision Making and Choose the right action for Prevent Obesity		
Good	149	26.0
Moderate	252	44.1
Poor	171	29.9
Lifestyles Questionnaires		
Good	16	2.8
Moderate	440	76.9
Poor	116	20.3

Table 3: Personal Health status of high school students, Phatthalung province, Thailand (N = 572)

Variable	Frequency	Percentage (%)
Body mass index (BMI)		
Thinness (0–18.49)	139	24.3
Normal (18.5–22.99)	239	41.8
Overweight (23–24.99)	56	9.8
Obese level 1a (25–29.99)	88	15.4
Obese level 1b (30–34.99)	39	6.8
Obese level 2 (35–39.99)	9	1.6
Obese level 3 (40–100)	2	0.3
BMI for Age		
Severe thinness	3	0.5
Thinness	21	3.7
Normal	387	67.7
Overweight	102	17.8
Obesity	59	10.3
Waist circumference		
Normal	409	71.5
Abnormal	163	28.5

Table 4: Association between factors and health literacy to prevent obesity (N = 572)

Variables	Adequate Health Literacy	Inadequate Health Literacy	OR	p-value	95% CI
Gender					
Male	104	49	1.04	0.86	0.69-1.54
Female [ref]	288	131			
Age					
15	75	41	1.40	0.24	0.80-2.45
16	91	38	1.07	0.81	0.61-1.87
17	144	69	1.29	0.42	0.75-2.02
18 [ref]	82	32			
Religion					
Buddhism	346	161	1.13	0.68	0.64-1.99
Other [ref]	46	19			
Sufficiency of income					
Inadequate	45	24	1.19	0.53	0.70-2.02
Adequate [ref]	347	156			
Grad report					
Excellent	13	4	0.41	0.26	0.09-1.92
Good	221	91	0.55	0.28	0.19-1.63
Moderate	150	79	0.70	0.53	0.24-2.10
Not good [ref]	8	6			
Parental Marital status					
Widowed/Divorced/Seperated	79	40	1.13	0.57	0.47-1.74
Marry [ref]	313	140			
Parental Education level					
Primary school	76	46	1.78	0.03*	1.06-3.01
Secondary school	157	84	1.58	0.05	0.99-2.49
Associate Degree/Certificate	50	13	0.77	0.47	0.38-1.57
Bachelor's degree and above [ref]	109	37			
Parental Occupation					
Farming	160	84	1.80	0.03*	1.06-3.08
General employee	41	25	2.01	0.03*	1.06-4.14
Personal business	86	43	1.72	0.07	0.95-3.10
Work in a factory	6	2	1.15	0.87	0.22-6.06
Private company employees	16	3	0.64	0.51	0.17-2.41
Unemployed	4	0	0.00	0.99	0
Government employee [ref]	79	23			

Variables	Adequate Health Literacy	Inadequate Health Literacy	OR	p-value	95% CI
Family health history of obesity					
Answer more than 1	270	116	0.82	0.29	0.56-1.19
None [ref]	122	64			
BMI for Age					
Thinness	11	13	0.35	0.01*	0.15-0.8
Overweight	67	35	0.79	0.32	0.5-1.26
Obesity	40	19	0.87	0.64	0.48-1.56
Normal [ref]	274	113			
Waist circumference					
Abnormal (over standard)	112	51	1.00	0.95	0.67-1.50
Normal [ref]	280	129			
Physical activity					
Poor	116	72	1.50	0.10	0.92-2.44
Moderate	189	72	0.92	0.73	0.57-1.48
Good [ref]	87	36			
Physical activity					
Poor	116	72	1.50	0.10	0.92-2.44
Moderate	189	72	0.92	0.73	0.57-1.48
Good [ref]	87	36			
Eating Behavior					
Poor	159	86	1.34	0.11	0.94-1.91
Moderate and Good [ref]	233	94			
Stress management behavior					
Poor [ref]	115	66			
Moderate	148	69	1.19	0.35	0.82-1.75
Good	129	45	1.54	0.04*	1.02-2.31
Sugar–sweetened behavior					
6-7day/week [ref]	58	44			
4-5day/week	106	42	0.52	0.02*	0.31-0.89
3day/week	110	60	0.72	0.20	0.44-1.19
1-2day/week	108	32	0.39	0.001*	0.22-0.68
Never	10	2	0.26	0.10	0.05-1.27
Smoking behavior					
6-7day/week	6	3	1.04	0.96	0.26-4.19
4-5day/week	16	3	0.39	0.14	0.11-1.35
3day/week	17	3	0.37	0.11	0.11-1.27
1-2day/week	9	5	1.15	0.80	0.38-3.49
Never [ref]	344	166			

Variables	Adequate Health Literacy	Inadequate Health Literacy	OR	p-value	95% CI
Alcohol consumption behavior					
6-7day/week	10	3	0.80	0.74	0.22-2.97
4-5day/week	17	9	1.41	0.42	0.61-3.27
3day/week	36	15	1.11	0.75	0.59-2.12
1-2day/week	46	47	2.73	0.00*	1.72-4.34
Never [ref]	283	106	Ref	Ref	Ref
Sleep behavior					
Never [ref]	12	4			
1-2day/week	70	31	1.33	0.65	0.40-4.45
3day/week	96	42	1.31	0.65	0.40-4.31
4-5day/week	113	57	1.51	0.49	0.47-4.90
6-7day/week	101	46	1.37	0.61	0.42-4.47
Internet used behavior					
6-7day/week [ref]	153	95			
4-5day/week	111	42	0.61	0.03*	0.39-0.94
3day/week	60	17	0.46	0.01*	0.25-0.83
1-2day/week	56	17	0.49	0.02*	0.27-0.89
Never	12	9	1.21	0.68	0.49-2.98
Slim pill behavior					
4-7day/week	27	4	0.63	0.14	0.33-1.19
3day/week	11	6	1.12	0.82	0.41-3.09
1-2day/week	12	4	0.69	0.52	0.22-2.16
Never [ref]	342	166			
Health Behaviors					
Poor	72	44	4.28	0.06	0.93-19.72
Moderate	306	134	3.07	0.14	0.69-13.68
Good [ref]	14	2			
Health Behaviors					
Poor [ref]	72	44			
Moderate	306	134	0.72	0.13	0.47-1.10
Good	14	2	0.23	0.06	0.05-1.08

* *p-value* < 0.05

Results

A total of 572 high school students participated in the study. The majority were female (73.3%), and most were 17 years old (37.2%), followed by 16 years (22.6%), 15 years (20.3%), and 18 years (19.9%). Most students were in Grade 6 (42.7%), followed by Grade 4 (29.3%) and Grade 5 (28.0%). The predominant religion among participants was Buddhism (88.6%). Regarding academic performance, 54.5% of students reported good grades, while 40.0% had moderate performance, 3.0% were excellent, and 2.5% reported poor performance. In terms of household income, 49.2% of students indicated their income was sufficient with savings, and 38.8% reported sufficiency without savings. The majority of students (75.7%) stated that their parents were married and living together. Parental education levels varied, with the highest proportion having completed high school (29.2%), followed by a bachelor's degree (20.8%) and primary school (21.2%). The most common parental occupation was agriculture (42.7%), followed by self-employment (22.6%) and government service (17.8%). Regarding family health history, 32.5% of participants reported no family members with obesity, while 21.5% reported obesity in more than two family members. The most commonly reported obese relatives were mothers (20.3%) and fathers (12.9%).

Table 2 shows the distribution of health literacy levels among high school students regarding obesity prevention. The majority of students (65.4%) demonstrated a moderate level of health literacy, while 31.5% exhibited a low level, and only 3.1% reached a high level of health literacy. When examining the sub-dimensions of health literacy: Functional health literacy was found to be moderate in 70.8% of students, low in 17.0%, and high in 12.2%. Communicative health literacy was low in 45.3% of students, moderate in 50.0%, and high in only 4.7%. Critical health literacy was moderate in 57.3%, low in 30.5%, and high in 12.2%. These findings suggest that although most students possess a functional understanding of health information, communicative and critical literacy remain areas for improvement. The relatively low proportion of students with high levels in all three dimensions highlights the need for targeted health education interventions that go beyond basic knowledge and focus on developing interactive and evaluative skills.

Table 3 presents the personal health status of high school students based on body mass index (BMI), BMI-for-age, and waist circumference measurements. According to the BMI classification for Asian populations, the majority of students had a normal BMI (18.5–22.99), accounting for 41.8%. Approximately 24.3% were classified as thinness (BMI < 18.5), while 9.8% were overweight (23–24.99). A total of 15.4% had obesity level 1a (25–29.99), 6.8% had obesity level 1b (30–34.99), 1.6% had obesity level 2 (35–39.99), and 0.3% were classified as obesity level 3 (BMI ≥ 40). These results suggest that although the majority of students maintained a normal BMI, a considerable proportion (approximately 34%) were overweight or obese to varying degrees. Based on BMI-for-age classification, 67.7% of students had a normal BMI-for-age, 17.8% were categorized as overweight, 10.3% as obese, 3.7% as thin, and 0.5% were classified as severely thin. This age-adjusted data reinforces the finding that most students fall within a healthy weight range, though a notable proportion are overweight or obese—indicating an increased risk of future non-communicable diseases (NCDs). In terms of waist circumference, 71.5% of participants had a normal waist circumference, while 28.5% exhibited abnormal (high-risk) waist circumference levels. This suggests that nearly one-third of the students may be at increased risk for abdominal obesity, which is frequently associated with metabolic disorders.

The associations between individual, familial, and behavioral factors and health literacy to prevent obesity were analyzed using multiple logistic regression (Table 4). The results revealed several statistically significant associations: Parental education level was significantly associated with students' health literacy. Students whose parents had completed only primary school were 1.78 times more likely to have adequate health literacy compared to those whose parents held a bachelor's degree or higher (OR = 1.78, 95% CI = 1.06–3.01, p = 0.03). Parental occupation was also significantly associated. Students whose parents were general employees (OR = 2.01, 95% CI = 1.06–4.14, p = 0.03) or farmers (OR = 1.80, 95% CI = 1.06–3.08, p = 0.03) were significantly

more likely to have adequate health literacy compared to those with parents in government employment. BMI-for-Age, found to be significantly associated with adequate health literacy. After combining the "Severe thinness" and "Thinness" groups into one category, participants with thinness (combined) were significantly less likely to have adequate health literacy compared to those with normal BMI. The odds ratio (OR) was 0.35 (95% CI: 0.15–0.80, p = 0.013), indicating a strong negative association. In contrast, those in the overweight (OR = 0.79, 95% CI: 0.50–1.26, p = 0.318) and obese (OR = 0.87, 95% CI: 0.48–1.56, p = 0.638) categories showed no statistically significant difference in health literacy when compared to the normal group. Stress management behavior had a strong association. Students with poor behavior were significantly more likely to report adequate health literacy (OR = 2.72, 95% CI = 1.48–5.01, p = 0.001), as were those with moderate behavior (OR = 2.08, 95% CI = 1.23–3.52, p = 0.006), compared to those with good stress management. Sugar-Sweetened Beverage Consumption, compared to adolescents who consumed sugar-sweetened beverages 6–7 days/week, those who consumed such beverages 1–2 days/week were significantly more likely to have adequate health literacy (OR = 0.39, 95% CI = 0.22–0.68, p = 0.001). Also, those who drank 4–5 days/week had a significantly lower likelihood (OR = 0.52, p = 0.02). This suggests an inverse relationship between frequency of sugar-sweetened drink consumption and health literacy. Alcohol Consumption, unexpectedly, those who drank 1–2 days/week were 2.73 times more likely to have adequate health literacy ($p < 0.001$; 95% CI: 1.72–4.34) compared to non-drinkers. Other drinking frequencies (3–7 days/week) did not show a statistically significant association with health literacy. This finding may appear counterintuitive as abstinence is generally associated with better health outcomes. However, those who consumed alcohol occasionally (1–2 days/week) may possess greater awareness and decision-making skills, enabling moderate and informed behavior. It is also possible that self-reporting bias or cultural norms influenced the outcome. Variables such as gender, age, religion, income sufficiency, family history of obesity, sleep patterns, smoking, and eating behaviors were not significantly associated with health literacy in this study ($p > 0.05$).

Discussion

This study aimed to examine the factors associated with health literacy (HL) for obesity prevention among high school students in Phatthalung Province, Thailand. The findings revealed several statistically significant associations between personal characteristics, family background, and health-related behaviors and the students' levels of health literacy. These results underscore the multifactorial nature of health literacy and highlight the importance of considering both individual and contextual factors when developing health promotion strategies targeting adolescents.

One of the key findings of this study is the association between parental education and students' health literacy. Interestingly, students whose parents had completed only primary or secondary education were more likely to have adequate health literacy compared to those whose parents held a bachelor's degree or higher. This may reflect greater attentiveness to health or more active participation in community-based health promotion programs among families with lower educational backgrounds. However, this finding contradicts previous studies, which typically report a positive correlation between higher parental education and children's health literacy[13], indicating a need for further context-specific investigation. Parental occupation also significantly influenced student health literacy. Students whose parents were employed in agriculture or general labor had higher odds of possessing adequate health literacy. These occupations may allow for more time spent at home, enabling family-based health discussions, or may provide greater exposure to local health volunteers or community health workers, as observed in similar rural studies[8]. Another notable finding was that students classified as thin based on BMI-for-age were more likely to demonstrate adequate health literacy than those with normal weight. This may reflect increased body image awareness or concern about nutrition among underweight adolescents. However, no significant association was observed for students who were overweight

or obese—contrasting with existing literature that links higher health literacy with healthier weight status[13]. Contrary to expectations, students with poor physical activity levels were more likely to exhibit adequate health literacy. This may suggest a disconnect between knowledge and behavior—students may be aware of obesity-related risks but fail to translate that knowledge into active lifestyles. This phenomenon aligns with behavior-change models such as the Health Belief Model[14]. Similarly, students who reported poor stress management behaviors also had higher health literacy levels, which may indicate heightened awareness of stress-related health risks without corresponding coping strategies. Unexpectedly, students who consumed sugar-sweetened beverages less frequently (1–2 days per week) were less likely to have adequate health literacy than those who consumed them daily. While counterintuitive, this may reflect underreporting of consumption, or suggest that health literacy alone may not fully predict dietary behavior. In contrast, alcohol consumption (1–2 days per week) was associated with higher odds of adequate health literacy, possibly reflecting a subgroup of students who are both socially exposed and more aware of health issues, highlighting a complex interplay between awareness, age, and lifestyle risk-taking. Furthermore, internet use demonstrated an inverse relationship with health literacy. Students who used the internet less frequently had lower odds of possessing adequate health literacy compared to daily users. This supports the notion that regular internet use can enhance access to health information, especially among digitally native adolescents[15]. Finally, factors such as gender, age, religion, income sufficiency, family history of obesity, sleep patterns, smoking, and eating behaviors showed no statistically significant associations with health literacy in this study, suggesting that health literacy may be shaped more by behavioral, informational, and educational exposures than by demographic characteristics alone.

Conclusion

This study highlights several behavioral and parental factors that significantly influence health literacy for obesity prevention among Thai high school students. Key factors associated with higher health literacy include parental occupation and education, BMI-for-age, physical activity levels, stress management behaviors, alcohol consumption, sugar-sweetened beverage intake, and internet usage. The results underscore a critical gap between health knowledge and actual health behavior, reinforcing the need for comprehensive, school-based health education programs that go beyond information delivery and focus on behavior change, critical thinking, and life skills development. Health literacy interventions should be tailored to students' real-life environments and involve families and communities, especially in rural settings. Future studies should explore these associations longitudinally and qualitatively to better understand the motivations and barriers behind adolescent health literacy and behavior. A key limitation of this study is the use of self-administered questionnaires, which may be subject to recall bias and social desirability bias, particularly in the self-reporting of health behaviors such as dietary habits, physical activity, and alcohol consumption.

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Anonymous Reporting System as an Effort to Improve the Reporting Culture of Patient Safety Incidents

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Abstract

Background: Incident reporting systems are essential mechanisms designed to gather information regarding patient safety incidents within hospitals. An effective reporting system can prevent the recurrence of similar incidents in the future by ensuring the safety of informants, allowing them to report without fear of negative repercussions, such as threats or intimidation related to the information provided.

Materials and Methods: This research utilized a True Experimental design with a Posttest Only Control Group Design, incorporating both control and intervention groups. Data collection was conducted through a Patient Safety Incident Reporting System utilizing Google Forms. The data collection instrument consisted of a questionnaire designed for reporting patient safety incidents.

Results: The findings indicated a notable increase in the number of anonymous reports of patient safety incidents. However, there were no significant differences in the timeliness and completeness of data between the anonymous and conventional reporting systems.

Keywords: Incident reporting system, Patient safety, Anonymity

Introduction

Patient safety incidents are unintended events that may or may not cause harm to patients and are unrelated to their underlying medical conditions (Gqaleni & Mkhize, 2024). To improve patient safety, hospitals need to identify and address issues that could potentially harm patients, ensuring similar incidents do not recur by reporting patient safety incidents (Kemenkes RI, 2017). In hospitals, incident reporting is a mandatory requirement and must become a cultural norm to allow incidents to be analyzed and used as learning opportunities by identifying root causes and developing solutions. The culture of implementing patient safety incident reporting has become a benchmark for the quality of healthcare services (Budi et al., 2019). Patient

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safety incident reporting systems are designed to convey information; however, the culture of incident reporting in Indonesia has generally not been optimally implemented (Harsula et al., 2020).

Many countries have reported an annual increase in patient safety incidents and near-miss events in hospitals, which has become a public concern, including in South Africa. The Institute of Medicine (IOM) revealed that deaths due to patient safety incidents vary between 44,000 to 98,000 annually, leading to increased hospital expenditure (Gqaleni & Mkhize, 2024). In Indonesia, in 2019, there were 7,465 reported cases comprising 38% near-miss events, 31% non-injury incidents, and 31% adverse events (Toyo et al., 2022).

Several studies have identified barriers to reporting patient safety incidents, including fear of blame, lack of feedback, fear of sanctions, and perceptions that reporting does not contribute to improved patient safety (Fujita et al., 2021). A study by Patmawati & R. Djano (2020) found that 55% of respondents demonstrated negative attitudes toward the culture of patient reporting, while 45% showed positive attitudes. One of the main factors contributing to positive responses was workplace collegiality, as discomfort and fear of punishment were significant deterrents. Moreover, Dhamanti et al. (2023) stated that factors influencing the low reporting rates in hospitals include lack of knowledge, understanding, responsibility for reports, insufficient leadership, and the perception of reporting as an additional burden.

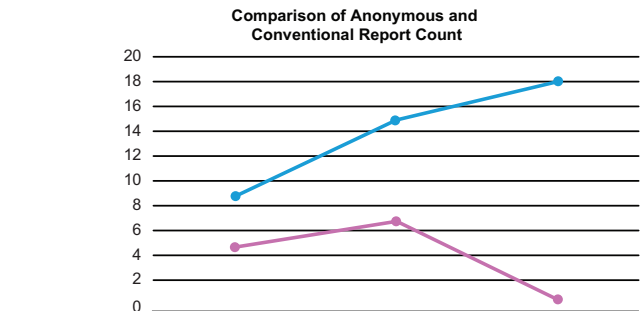
This suboptimal reporting culture has the potential to hinder efforts to improve patient safety because, without adequate data and information, hospitals struggle to identify incident patterns and develop better prevention strategies. Dhamanti et al. (2023) emphasized the need for reform in patient safety incident reporting systems, particularly concerning confidentiality, by anonymizing personal identifiers.Therefore, the aim of this study is to examine the extent of the comparison between anonymous and conventional reporting systems in hospitals for successful reporting. Confidentiality is one of the characteristics recommended by WHO for an effective Patient Safety Incident Reporting System.

Materials and Methods

This study employed a Posttest Only Control Group Design to compare the effectiveness of anonymous and conventional reporting systems. The population consisted of all nurses working at the Regional General Hospital dr. Zainoel Abidin. The sample comprised incident reports collected through a Google Form-based reporting system. Cluster random sampling was utilized for sample selection. The data collection instrument was a questionnaire in the form of a checklist, designed based on anonymous and conventional reporting systems sourced from the Google Form database. Data collection was conducted after obtaining ethical approval from the Ethics Committee of the Regional General Hospital dr. Zainoel Abidin, Banda Aceh.

Results

The study was conducted over three months, from October to December 2024. Out of a total of 55 samples, the number of incident reports included 42 reports in the anonymous group and 13 reports in the conventional group. The details of the comparison of the number and average reports for anonymous and conventional systems are presented in Figure 1.



	October	November	December
Anonymous	9	15	18
Conventional	5	7	1

Figure 1. Comparison of Anonymous and Conventional Reports

Further analysis indicated an increase in anonymous reports compared to conventional reports. The anonymous reports totaled 42, while conventional reports totaled 13. The results of the Independent Samples Test yielded a p-value of 0.03, indicating a significant difference between the two reporting systems.

Discussion

The results of the study indicate that the average number of reports in the two groups, namely the anonymous reporting system and the conventional reporting system, shows that anonymity in reporting is highly important. This finding aligns with the study by Dhamanti et al. (2023), which highlighted negative impacts on incident reporting, such as fear of punishment, feelings of anxiety, limited time to report incidents, lack of feedback, and insufficient anonymity. The book "To Err is Human" emphasizes that to improve professional healthcare services and focus on patient safety, various methods have been employed, including confidential and voluntary reporting systems that focus on identifying root causes (Brado et al., 2021).

A study by Azyabi et al. (2021) revealed that a significant portion of respondents refrained from reporting incidents due to fear of reprimand from their managers or supervisors. Healthcare workers, particularly nurses, are more likely to report incidents if they feel safe from accusations and punishment, are involved in the investigation and improvement processes after incidents, and observe periodic risk reduction for patients (Donaldson, 2020). Incident reporting systems are considered to help improve patient safety, and confidential and voluntary reporting is deemed essential to understand the frequency and types of adverse incidents without fear of punishment or sanctions, with the goal of encouraging more individuals to report incidents (Stavropoulou et al., 2015). The improvement of service quality and prevention efforts heavily depend on nurses' adherence to patient safety principles (Vaismoradi et al., 2020). Therefore, all healthcare workers must develop a sense of responsibility by identifying and reporting incidents through non-punitive reporting systems (Camacho-Rodríguez et al., 2022).

A non-punitive culture needs to be implemented by managers or supervisors to ensure that staff do not fear punishment and are less likely to conceal their mistakes, thereby fostering a culture of reporting and its application (Fekadu et al., 2025). Nurses' attitudes play a crucial role in healthcare services and safety and have a significant impact on the unit's patient safety culture (Alanazi et al., 2022). Leadership commitment to fostering a culture of patient safety incident reporting must also begin with creating a positive and supportive atmosphere and recognizing those who report incidents (Shemsu et al., 2024).

Patient safety incident reporting is a critical mechanism for improving patient safety. Many countries have emphasized the principle of incident reporting with a non-blaming culture, established as the concept of a "just culture," to encourage healthcare workers to exchange information about patient safety (Han et al., 2024). Another study also noted that healthcare workers lose motivation due to the lack of feedback when reporting incidents. In Saudi Arabia, it was found that high positive responses were associated with feedback and communication about errors (Azyabi et al., 2021). Regular feedback processes and leadership support for patient safety principles can motivate nurses' adherence to patient safety through incident reporting (Vaismoradi et al., 2020).

Conclusion

The study demonstrated that anonymous incident reporting systems tend to increase the number of incident reports compared to conventional systems. The primary reason for this increase is that anonymity alleviates fears of punishment, discrimination, or other negative consequences for reporters. With the assurance of anonymity, staff feel more comfortable reporting incidents without concern.However, anonymous systems also present challenges, such as reduced accountability for reporters and lack of feedback. The reporting culture remains suboptimal in terms of timeliness and data completeness, as nurses may lack clarity on what incidents should be reported. Therefore, training to enhance understanding and skills is crucial for effective incident reporting.

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Efficacy of Garlic Pill Supplementation as Adjunctive Therapy for Managing Pre-hypertension in Working Professionals: An Experimental Study

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ABSTRACT

Introduction: This study delves into the effectiveness of adjunctive therapy utilizing garlic pills (Allium Sativum) among hospital employees in the prehypertensive stage. It aims to address the heightened risk of prehypertension progressing to hypertension, cardiovascular diseases, and stroke. Moreover, this study aims to enhance public awareness regarding the potential use of garlic pills for blood pressure management, offering professional guidance and advocating for further exploration of adjunctive therapy.

Methods: Employing a pre-experimental one-group Pretest-Posttest design grounded in Von Bertalanffy's General System Theory, the research involves 100 prehypertensive hospital staff members aged 25 to 65, selected through convenience sampling. Over a period of six months, data collection includes baseline assessments and three months of daily intake of 500 mg garlic pills. Results: Significant mean differences in various clinical parameters are evident in the primary findings, affirming the efficacy of garlic pills in blood pressure regulation. Posttest scores are further examined in correlation with demographic variables such as gender, marital status, education level, and lifestyle characteristics. Overall, post-intervention data reveal promising results, with 47% of individuals with moderate hypertension and 52% of those with mild hypertension demonstrating positive outcomes.

Conclusion: Garlic pill adjunctive therapy emerges as a potentially effective approach for blood pressure reduction, with lifestyle modifications recommended as complementary measures for optimal prehypertension control.

Keywords: Garlic Pills, Prehypertension, Diet, Exercise, Blood Pressure, Adjuvant Therapy

Introduction

Hypertension is emerging as a significant global public health challenge, with its prevalence projected to escalate, especially in urban centers[9,10,15]. Recognized as a pivotal and modifiable risk factor for cardiovascular disease, high blood pressure often remains asymptomatic until it precipitates a medical crisis, earning it the moniker of a "silent killer" disease[4]. Prehypertension, while not a distinct medical condition, heightens the risk of developing

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hypertension[20]. Hypertension is defined as a systolic BP of ≥ 140 mmHg and diastolic BP of ≥ 90 mmHg. The grey area falling between 120-39 mmHg systolic BP and 80-89 mmHg diastolic blood Pressure is defined as prehypertension[20]. According to the American Heart Association (2013), the Check, Change, Control program, designed to empower individuals in managing their cardiovascular health, represents a valuable initiative in hypertension control[15]. Prehypertension persists as a notable health concern worldwide, bridging the gap between normal blood pressure and clinical hypertension and substantially elevating the risk of heart diseases[15,20]. A study by the Indian Council of Medical Research (ICMR) stated that approximately 33.7% of adults aged from 18 to 54 suffering from prehypertension[24]. The prevalence varies between various districts ranging from 15.6 to 63.4% with higher rates observed in high income people sand among individuals who are overweight or obese . Patients with prehypertension (blood pressure ranging from 120-139 mm Hg systolic and 80-89 mm Hg diastolic) face a significantly heightened risk of cardiovascular morbidity and mortality compared to those with normal blood pressure (<120/80 mm Hg)[12].

India, in particular, grapples with hypertension as a pertinent risk factor for chronic diseases, with studies reporting a high prevalence across various regions[7,10]. Globally, approximately 26% of the population, totaling 972 million individuals, are affected by hypertension, a figure expected to rise to 29% by 2025[9]. Hypertension contributes to an estimated 7.5 million deaths annually, comprising 12.8% of all deaths worldwide (Global Health Observatory data, WHO). Notably, Africa exhibits the highest prevalence of hypertension across the WHO regions, surpassing 40% for both genders, while the lowest prevalence is observed in the Americas, with rates of 39% for men and 33% for women[9,10]. Prehypertension serves as an early indicator of impending sustained high blood pressure, escalating the risk of heart attacks, strokes, and other cardiovascular complications[20]. According to the WHO 2022 report as blood pressure readings range from 120/80 mm Hg to 139/89 mm Hg, prehypertension typically presents without symptoms, necessitating regular blood pressure monitoring for detection. Guidelines outlined in the 7th report from the Joint National Committee provide stratified recommendations for preventing, detecting, assessing, and managing blood pressure across adulthood, starting from age 18. These guidelines delineate thresholds for systolic and diastolic pressure indicative of hypertension, guiding preventive, and therapeutic interventions for optimal cardiovascular health throughout the adult lifespan[7].

blood pressure Tier	Systolic blood pressure (Mm of Hg)	Diastolic blood pressure (Mm of Hg)
Normal	<120	<80
Prehypertension	121-139	81-89
Stage I-HT	140-159	90-99
Stage II-HT	≥160	≥100

Hypertension prevalence in India ranges from 21% to 42% in urban areas and 13% to 18% in rural regions, with one in three Indian adults diagnosed with high blood pressure, as per WHO Health Statistics 2018[22]. By 2023, India's hypertension prevalence is projected to reach 159.46 per 1000 population, contributing significantly to the disease burden. Hypertension-related deaths in India surged from 0.78 million in 1990 to 1.63 million in 2016, with Disability Adjusted Life Years (DALYs) increasing from 21 million to 39 million during the same period[8]. In Kerala, rapid epidemiological transition has led to a notable prevalence of non-communicable diseases (NCDs) like hypertension and diabetes mellitus[16]. Despite effective NCD control programs, hypertension affects .4% of women and 38.6% of men in Kerala. Risk factors associated with hypertension in Kerala include age, gender, central obesity, smoking, sedentary lifestyle, and high salt intake[5].

The high prevalence of prehypertension is concerning, with only one-third of diagnosed cases under control. Non-communicable disease control programs need to prioritize prehypertension management through health education, lifestyle modifications, and regular blood pressure monitoring to prevent the progression of hypertension[6]. Garlic (Allium Sativum) has gained attention for its antibacterial and antioxidant properties, particularly

allicin's role in lowering blood pressure[18]. Recent studies have documented garlic's efficacy in hypertension treatment, highlighting its potential in combination therapies with adequate allicin doses. Therefore, healthcare providers should focus on optimizing blood pressure control through comprehensive treatment strategies rather than solely relying on medications[17]. Prehypertension is frequently disregarded since it usually shows no symptoms, yet it raises the chance of developing into hypertension and its associated problems, including heart disease, stroke, and renal failure. Although a lot of study has been done on hypertension, little is known about its early phases, particularly in certain areas or groups where local data is limited. Prehypertensive status is still unknown to many people, and less is known about lifestyle determinants, awareness levels, and how well preventive measures work in these groups. Looking out the prevalence of prehypertension, rise in public awareness, and offering evidence-based recommendations for early therapies that can lessen the strain on healthcare systems and long-term health consequences are all made possible by this study.

Materials and Methods

The research methodology involved six months of data collection at Chitra Multispecialty Hospital and Lifeline Multispecialty Hospital in Pathanamthitta District, Kerala, after obtaining formal written permission from the respective medical superintendents. The study was introduced to the hospital employees, and informed consent was individually obtained from prehypertensive individuals. Screening for prehypertensive individuals involved checking blood pressure levels over 10 days, with a minimum of three readings considered. Data collection occurred on all days of the week during daytime hours. Convenience sampling was used to select participants, and a pre-experimental one-group pretest-posttest design was employed.The total sample size was limited to 100 since the sample size is focused on hospital employees and which is ease in knowing about the health status of the patient. Participants with blood pressure levels ranging from 121-139 mm Hg (systolic) to 81-89 mm Hg (diastolic) were classified as prehypertensive. Screening of hospital employees to identify the prehypertensive employees by checking the blood pressure level with in a duration of 10 days and a minimum of 3 readings are considered. All the enrolled participants underwent baseline screening for relevant comorbidities. Researchers obtained medical histories through structured interviews and review of medical records, and measured key vital signs, including blood pressure. These data were used to determine eligibility based on predefined inclusion and exclusion criteria, as well as to adjust analyses for relevant covariates. A priori power analysis was conducted to ensure adequate statistical power to detect meaningful effects, thereby enhancing the validity and interpretability of the findings. The classic two-sample means formula was applied for sample size estimation.

$$t = (\bar{x}_1 - \bar{x}_2) / SE = (\bar{x}_1 - \bar{x}_2)$$

Inclusion Criteria

- Hospital Employees who were available during the time of data collection.
- Hospital employees who are willing to participate in the study.
- Hospital Employees those who were age above 25 yrs and below 65 yrs.
- A hospital employee whose blood pressure level was between 121-139 mm Hg of (Systolic BP) to 81-89 mm Hg of (diastolic BP).
- Hospital Employees who were regularly working in the setting.
- Hospital Employees who were able to read and write English and Malayalam.

Exclusion Criteria:

- Prehypertensive hospital employees who refused to participate in this study.
- Hospital Employees with complications like Hormonal disorder and seriously having Gastric trouble towards Garlic.
- Employees who were pregnant and lactating mothers.

The total sample size was limited to 100 since the sample size is focused on hospital employees and which is ease in knowing about the health status of the patient.

Participants with blood pressure levels ranging from 121-139 mm Hg (systolic) to 81-89 mm Hg (diastolic) were classified as prehypertensive. Screening of hospital employees to identify the prehypertensive employees by checking the blood pressure level with in a duration of 10 days and a minimum of 3 readings are considered. They were instructed to take garlic pills with water every morning before breakfast for three months. Recent research has highlighted the potential cardiovascular benefits of garlic supplementation. Varshney and Budoff (2016) conducted a PubMed-based literature review to evaluate its effects on hypertension, hypercholesterolemia, C-reactive protein (CRP), pulse wave velocity (PWV), and coronary artery calcium (CAC). The search included all human studies indexed with Medical Subject Headings (MeSH) up to May 30, 2013, as well as relevant review papers and original research. Only randomized, controlled, double-blind trials and meta-analyses of such trials were considered eligible. The review identified four meta-analyses and two original trials, which collectively demonstrated that garlic supplementation reduced systolic blood pressure by 7–16 mmHg and diastolic blood pressure by 5–9 mmHg. The authors concluded that garlic supplementation may protect the cardiovascular system by lowering risk factors such as total cholesterol and hypertension, while also improving surrogate markers of atherosclerosis[23].

At the conclusion of the intervention, a Cholesterol Analyzer Test (CAT) was performed to assess clinical parameters, which yielded statistically significant results. Data collection was carried out throughout the intervention period, and post-intervention blood pressure levels were evaluated using standardized clinical measures.Ethical approval was obtained from the institutional human ethics committee (project no. CCON 11/002/2018, 23/10/2018).

Statistical analysis

Statistical analysis was performed using Statistical Package for Social Science (SPSS)/PC, Version 20. The data analysis plan comprised descriptive analysis, where frequency and percentage distributions were computed to examine demographic variables. Mean and standard deviation calculations were employed to analyze the pre- and post-test levels of mental health characteristics. Significance levels were set at $p < .001$ for high significance and $p < 0.01$ for significance. Inferential statistics utilized a paired t-test to compare pre- and post-levels of prehypertension. An unpaired t-test was applied to evaluate prehypertension levels between the control and intervention groups. Additionally, a post-hoc Scheffe test was conducted for multiple comparisons of clinical variables in the intervention group post-test, with statistical significance set at $p < 0.01$.

Results

Sample characteristics.

Table 1: Frequency and percentage distribution of sample characteristics N = 100

Sample characteristics	Frequency	Percentage
Age Group (Years)		
a) 25–35	34	34
b) 36–45	46	46
c) 46–55	7	7
d) 56–65	3	3
Gender		
a) Male	67	67
b) Female	33	33
Marital status		
a) Married	65	65
b) Unmarried	14	14
c) Widow/widower	18	18
d) Separated	3	3
Religion		
a) Hinduism	48	48
b) Muslim	34	34
c) Christian	18	18
Type of family		
a) Nuclear family	35	35
b) Joint family	60	60
c) Extended family	05	05
Educational background		
a) Up to primary	07	07
b) Up to secondary	22	22
c) Class 12	36	36
d) Collegiate and above	35	35

Table 1 illustrates the demographic composition of participants. Within the age group, 46% fall between 45-65 years old, while 67% are female. Additionally, 48% of clients identify as Hindu, with the majority (65%) being married. A significant portion (60%) of participants come from joint family, while 36% have attained education up to the higher secondary level.

Effectiveness garlic pills as adjuvant therapy

Table 2: Effectiveness of garlic pills supplementation as adjuvant therapy on pre hypertensive working professionals

Clinical Profiles	Pre-test		Post-test		t-value	p-value
	Mean	SD	Mean	SD		
Systolic Pressure	128.90	0.5	115.21	0.4	22.96	<0.05
Diastolic Pressure	84.98	0.2	74.02	0.4	26.62	<0.05
Pulse Pressure	43.94	0.4	41.20	0.4	5.21	<0.05
Neck Circumference	48.91	0.7	45.32	0.6	4.00	<0.05
Waist Circumference	97.54	1.4	90.78	1.2	3.64	<0.05
Lipid Profile						
HDL	31.44	0.6	48.29	0.6	19.58	<0.05
LDL	153.60	1.6	133.11	1.3	10.11	<0.05
VLDL	46.49	1.2	28.85	0.5	13.78	<0.05
Triglycerides	187.16	15.8	147.93	1.6	2.46	<0.05

Table 2 displays the pre-test and post-test mean values of clinical parameters related to blood pressure among prehypertensive hospital employees. The table reveals a decrease in mean values across all clinical profiles following the administration of garlic pills. Specifically, there is a mean reduction in systolic blood pressure by 14 units, diastolic pressure by 10.96 units, pulse pressure by 2.74 units, neck circumference by 3.59 units, waist circumference by 6.76 units, LDL by 20.49 units, VLDL by 17.64 units, and triglycerides by 39.23 units, with an overall mean difference increasing by 16.85 units. Statistical analysis demonstrates significant differences at a confidence level of $p < 0.05$. These findings suggest that the use of garlic pills resulted in a noteworthy decrease in clinical parameters, confirming the research hypothesis.

Association

Table 3: Association between level of blood pressure and gender N = 100

Gender	Systolic blood pressure			Chi-Square	df	p-value
	≤ 125 mm of hg	126-130 mm of hg	>130 Mm of hg			
Male	12	11	34	8.92	2	.012
Female	13	17	13			

Gender	Diastolic blood pressure		Chi-Square	df	p-value
	≤ 85mm/hg	> 85 mm/hg			
Male	28	29	5.35	1	.017
Female	31	12			

Table 3 illustrates the pretest data on gender and systolic blood pressure among prehypertensive hospital employees. Among the samples, 25 (25%) had systolic blood pressure ≤ 125 mmHg, 28 (28%) had systolic blood pressure ranging from 126-130 mmHg, and 47 (47%) had systolic blood pressure > 130 mmHg. The calculated Chi-Square value of 8.92 is significant at $p < .012$, indicating a notable correlation between gender and systolic blood pressure. Additionally, the pretest data on gender and diastolic blood pressure reveal that 59 (59%) samples had diastolic blood pressure ≤ 85 mmHg, while 41 (41%) had diastolic blood pressure > 85 mmHg. The obtained Chi-Square value of 5.35 is significant at $p < .017$, suggesting a substantial association between gender and diastolic blood pressure among prehypertensive hospital employees.

Discussion

Hypertension is emerging as a critical public health issue in India, with a steady increase observed over recent decades[9,10]. Prehypertension often precedes hypertension in the current landscape, with hypertension contributing to 57% of stroke deaths and 26% of deaths due to coronary artery disease in India[4.] Projections indicate a rise in prehypertension prevalence among adults, with a subsequent increase in clinical hypertension over the next two decades, particularly affecting individuals aged 40 to 65, primarily in developing countries[13]. Clinical parameters such as systolic and diastolic blood pressure, pulse pressure, waist circumference, neck circumference, and lipid profiles including HDL, LDL, VLDL, and triglycerides were assessed through blood tests and sphygmomanometer readings[10].

Results revealed that among the prehypertensive samples, 52% exhibited mild hypertension and 47% moderate hypertension[19.] Systolic pressure was elevated in 28%, while diastolic pressure was elevated in 41%. Notably, the study observed significant reductions in clinical parameters above normal levels post-garlic pill administration, including systolic and diastolic blood pressure, neck and waist circumference, LDL, VLDL, and triglyceride levels[21]. Further analysis showed a significant relationship in post-test between demographic variables such as gender, marital status, education, type of work, working hours per day, height, weight, BMI, dietary patterns, salt intake, lifestyle practices, exercise, and leisure time activity among prehypertensive hospital employees, confirming the study hypothesis[3]. This finding aligns with prior research indicating a link between lifestyle factors and hypertension risk, as demonstrated by Sunil Kumar Jena and Kanhu Charan Purohit in a case-control study among MBBS male students[2].Their study revealed elevated blood pressure among smokers compared to nonsmokers, emphasizing the impact of smoking on hypertension risk[2,9,10].

In summary, study found that in the post-test analysis, 52% of the samples had mild hypertension and 47% had moderate hypertension. Significant reductions were observed in systolic blood pressure (13.69 mmHg), diastolic pressure (10.96 mmHg), pulse pressure (2.74 mmHg), neck circumference (3.59 cm), waist circumference (6.76 cm), LDL (20.49 mg/dl), VLDL (17.64 mg/dl), and triglycerides (39.23 mg/dl). The overall mean difference increased by 16.85 units, with a statistically significant difference ($P < 0.05$) (Tan & Thakur, 2024). Moreover, the study revealed a correlation between post-test scores and various demographic and lifestyle variables, including gender, marital status, education, occupation, working hours, height, weight, BMI, dietary habits, salt intake, lifestyle practices, exercise, and leisure time activity. Participants reported feeling more relaxed and satisfied after the administration of garlic pills, often sharing their positive experiences with family

and others and recommending similar interventions[1]. These findings highlight the importance of addressing prehypertension as a precursor to hypertension and highlight the potential benefits of interventions such as garlic pill supplementation in managing hypertension risk factors[14].

Conclusion

The daily intake of 500 mg of garlic pills proved effective in reducing clinical profiles related to blood pressure among prehypertensive hospital employees. This intervention holds promise for decreasing the morbidity and mortality rates associated with high blood pressure, contributing to a healthier lifestyle for employees. The limitations of the study are it is limited to a sample size of 100 and moreover the study is limited to the subjects with prehypertension who are working in the selected hospital setting. The future research can be a baseline for the future studies to motivate the investigators to conduct further studies in a larger setting. The study can be also formulating new methods to maintain the blood pressure.

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Original Article

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Key Factors Impacting the Discharge Planning Process at a Hospital in Banda Aceh: A Cross-Sectional Study

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Abstract

Background: Discharge planning is a systematic process initiated at the point of patient admission and carried out through discharge, intended to promote continuity of care and reduce the risk of post-discharge complications. Despite its recognized importance, the execution of discharge planning in many hospitals remains inadequate, often hindered by barriers such as ineffective communication, poor time management, and insufficient nurse motivation and knowledge.

Objective: This study investigates the relationship between nurses' communication skills, time availability, knowledge, and motivation, and the implementation of discharge planning within inpatient care settings.

Material and Method: A quantitative, cross-sectional design was utilized in this study. A total of 167 nurses from the inpatient wards of Banda Aceh Regional General Hospital (RSUD) were recruited through purposive sampling. Data were gathered using a validated and reliable structured questionnaire. The analysis included univariate techniques, bivariate analysis using the Chi-square test, and multivariate analysis employing logistic regression.

Results: The implementation of discharge planning was found to be significantly associated with all four independent variables: communication, time availability, knowledge, and motivation (all $p < 0.001$). Results from the multivariate logistic regression analysis identified motivation as the most influential predictor (OR = 10.67; 95% CI: 4.074–27.984), with communication (OR = 5.74), time (OR = 5.21), and knowledge (OR = 2.95) also demonstrating substantial effects.

Conclusion: Nurse motivation, communication, time availability, and knowledge play a critical role in supporting the delivery of high-quality discharge planning. Targeted interventions aimed at enhancing these four factors are strongly recommended to improve the effectiveness of patient care transitions from hospital to home.

Keywords: Key Factors, Discharge Planning, Nurses, Cross-Sectional Study

Introduction

Discharge planning is a patient care program initiated at hospital admission that involves collaboration among the healthcare team, the patient's family, the patient, and other relevant stakeholders. The primary objective of this process is to coordinate the continuity of care, emphasizing prevention, treatment, rehabilitation, and routine care integrated

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between the hospital and home settings.[1] Effective discharge planning can shorten hospital length of stay, prevent disease recurrence, create opportunities for other patients, and reduce hospital costs. Its implementation, in accordance with Standard Operating Procedures (SOP), requires the active involvement of all healthcare personnel from patient admission through discharge.[2]

However, in practice, discharge planning often encounters challenges such as poor coordination among healthcare providers, limited resources, and lack of follow-up after patient discharge. A study conducted in Iran reported suboptimal discharge planning implementation, primarily due to weak coordination and communication between healthcare professionals and patients.[3] Several hospitals in Indonesia have also reported that the implementation of discharge planning does not meet established standards, with more than half of respondents rating the discharge planning process in inpatient wards as suboptimal.[4,5] Therefore, effective communication and close coordination between healthcare providers and the patient's family are essential to ensure proper adherence to Standard Operating Procedures (SOP).[6]

Discharge planning conducted in accordance with Standard Operating Procedures (SOP) is anticipated to reduce hospital length of stay, decrease recurrence rates, prevent rehospitalization, and support patients' reintegration into daily life following discharge.[7] Successful implementation requires collaborative efforts from the healthcare team, including physicians, nurses, dietitians, medical rehabilitation specialists, and pharmacists.[8] The National Hospital Accreditation Standards (SNARS) stipulate that discharge planning must be initiated at the time of the initial inpatient assessment and must involve all relevant healthcare professionals.[9]

More than 20% of discharged patients fail to receive discharge planning that meets established standards, highlighting the need for hospitals to continuously improve the quality of this process.[10] A lack of knowledge among medical staff, particularly nurses, regarding the implementation of discharge planning has also been identified at Dumai Regional General Hospital.[11] Nurses' motivation plays a critical role in the successful implementation of discharge planning.[12] In addition, knowledge, patient and family readiness, effective communication, and the involvement of all healthcare providers are also key determinants of successful discharge planning.[13] Other influential factors in the implementation of discharge planning include nurses' characteristics, attitudes, motivation, collaboration with other healthcare professionals, and the time available to nurses.[14]

Observational findings at Banda Aceh City General Hospital indicate that the implementation of discharge planning forms by nurses remains suboptimal, despite the hospital having undergone accreditation. The use of specific discharge planning forms has been discontinued, and no subsequent dissemination efforts have been made to support its implementation. This situation highlights the importance of investigating the factors associated with the implementation of discharge planning at Banda Aceh City General Hospital.

Materials and Methods

Research design and setting

This study employed a quantitative approach with a cross-sectional design. Data collection was conducted in February 2025, following the acquisition of all necessary research permits. The researcher explained the objectives and benefits of the study to the respondents, who then provided written informed consent.

Population and sample

The study population consisted of all 304 staff nurses working in the inpatient wards of Banda Aceh Regional General Hospital. A total of 167 nurses were selected as the sample using purposive sampling based on predefined inclusion and exclusion criteria. The inclusion criteria included staff nurses working in inpatient wards, employed under civil servant, contract, or government-assigned positions, with a minimum of one year of work experience, not currently on leave or sick, and willing to participate as respondents. The exclusion criteria were head nurses and nurses on leave or sick for more than three days.

Procedure of study

Data were collected using structured questionnaires, which included instruments to assess communication, time availability, and nurses' knowledge related to discharge planning, as well as nurse motivation, measured using the Unified Motive Scale (UMS). The implementation of discharge planning was assessed using a dedicated discharge planning implementation questionnaire. All instruments were tested for content and face validity, and their reliability was confirmed by the researchers.

Respondents were asked to independently complete questionnaires covering demographic information, communication, time availability, nurses' knowledge and motivation, as well as their assessment of discharge planning implementation. The researcher, along with one trained enumerator, supervised the process to ensure clarity and completeness of responses. Upon completion, the questionnaires were reviewed and completed if necessary. Each questionnaire was then coded for data analysis.

The collected data were analyzed using univariate analysis with frequency distributions to describe the characteristics of respondents and each variable. Bivariate analysis was conducted using the chi-square test to examine the relationships between independent and dependent variables, with a significance level set at $p < 0.05$. Multivariate analysis employing logistic regression was performed to identify the most dominant factors associated with the implementation of discharge planning. Variables with $p < 0.25$in the bivariate analysis were included in the logistic regression model.

Results

Descriptive Statistics

Based on the study involving 167 nurses from the inpatient wards of Banda Aceh Regional General Hospital, the majority of participants were female (n = 91, 54.5%), aged between 23 and 32 years. Most held a Diploma III in Nursing (n = 116, 69.5%), were married (n = 113, 67.7%), and had a work experience of five years or less (n = 105, 62.9%). The majority had not participated in discharge planning training (n = 114, 68.3%). (Table 1)

Table1: Respondents'individualcharacteristic factors (N = 167)

Variables	Frequency	%
Age		
23-32 Years	91	54.5
33-42 Years	67	40.1
> 42 Years	9	5.4
Gender		
Male	35	21.0
Female	132	79.0
Last Education		
Diploma-III of Nursing	116	69.5
Bachelor of Nursing	23	13.8
Nurse Profession	28	16.8
Marriage Status		
Married	113	67.7
Notmarried	54	32.3
Length of Work		
≤ 5 Years	105	62.9
> 5 Years	62	37.1
Employment Status		
Civil Servant	10	6.0
Government Employee with a Work Agreement	104	62.3
Contract Employee	53	31.7
Training on the Implementation of Discharge Planning, Including the Completion of Discharge Planning Forms		
Received training	53	31.7
Not received training	114	68.3

The communication factor among nurses in the implementation of discharge planning was classified as good in 86 respondents (51.5%). Time availability was found to be inadequate in 88 respondents (52.7%) during the discharge planning process. A total of 90 respondents (53.9%) demonstrated good knowledge, while the level of motivation was low in 90 respondents (53.9%). Additionally, the implementation of discharge planning was categorized as suboptimal in 95 respondents (56.9%) (Table 2).

Table2: Frequency distribution of communication, time, knowledge, motivation factors, and discharge planning implementation (N = 167)

The categorization of "good" and "poor" is based on the respondents' mean scores. Communication is considered good if the score is ≥ 20.50 and poor if < 20.50. Time management is categorized as good if the score is ≥ 13.38 and poor if < 13.38. Knowledge is classified as good if the score is ≥ 6.86 and poor if < 6.86. Motivation is considered high if the score is ≥ 88.68 and low if < 88.68.

Variables	Frequency	%
Communication		
Good	86	51.5
Poor	81	48.5
Time		
Good	79	47.3
Poor	88	52.7
Knowledge		
Good	90	53.9
Poor	77	46.1
Motivation		
High	77	46.1
Low	90	53.9

Bivariate Analysis

The results of the Chi-Square test can be seen in table3 below:

Based on the results presented in the table above, among the 86 nurses with good communication factors, 58 nurses (67.4%) effectively implemented discharge planning. Conversely, among 81 nurses with poor communication factors, 67 nurses (82.7%) showed inadequate discharge planning implementation. Chi-square statistical analysis indicated a significant association between communication factors and discharge planning implementation at Banda Aceh Regional General Hospital (p = 0.000). Regarding the time factor, out of 79 nurses with adequate time availability, 59 nurses (74.7%) carried out discharge planning effectively. In contrast, among 88 nurses with insufficient time, 75 nurses (85.2%) demonstrated poor discharge planning implementation. The chi-square analysis confirmed a significant relationship between the time factor and discharge planning implementation at Banda Aceh Regional General Hospital (p = 0.000).

Regarding nurses' knowledge, among the 90 nurses with good knowledge, 54 (60.0%) demonstrated effective discharge planning implementation. In contrast, among the 77 nurses with poor knowledge, 59 (76.6%) exhibited inadequate discharge planning practices. Chi-square analysis revealed a significant association between nurses' knowledge and the implementation of discharge planning at Banda Aceh Regional General Hospital (p = 0.000). Regarding motivation, among the 77 nurses with high motivation, 57 (74.0%) effectively implemented discharge planning. Conversely, of the 90 nurses with low motivation, 75 (83.3%) demonstrated poor discharge planning practices. Chi-square analysis yielded a p-value of 0.000, indicating a significant association between motivation and the implementation of discharge planning at Banda Aceh Regional General Hospital (p = 0.000) (Table 3).

Multivariate Analysis

The results of the multivariate logistic regression analysis using the enter method are presented in table 4 below:

Based on the results presented in the table above, the independent variables that show a significant association with the implementation of discharge planning are motivation, communication, time, and knowledge, all of which have p-values less than 0.05. Among these four factors, motivation emerged as the most strongly associated factor with the implementation

Table 3: Association of Personnel Factors, Involvement and Participation, Communication, Time, Agreement and Consensus, Knowledge, and Motivation with the Implementation of Discharge Planning at Banda Aceh Regional General Hospital

Variables	Discharge Planning Implementation						p-value
	Good		Poor		Total		
	f	%	f	%	f	%	
Communication Factor							
Good	58	67.4	28	32.6	86	100	0.000
Poor	14	17.3	67	82.7	81	100	
Total	72	43.1	95	56.9	167	100	
Time Factor							
Good	59	74.7	20	25.3	79	100	0.000
Poor	13	14.8	75	85.2	88	100	
Total	72	43.1	95	56.9	167	100	
Knowledge Factor							
Good	54	60.0	36	40.0	90	100	0.000
Poor	18	23.4	59	76.6	77	100	
Total	72	43.1	95	56.9	167	100	
Motivation Factor							
High	57	74.0	20	26.0	77	100	0.000
Low	15	16.7	75	83.3	90	100	
Total	72	43.1	95	56.9	167	100	

of discharge planning. Therefore, further modeling was deemed unnecessary. This indicates that motivation has a statistically significant relationship with discharge planning, with a *p*-value of 0.000 and an odds ratio (OR) of 10.677 (95% CI: 4.074–27.984). This suggests that nurses with high motivation are 10.6 times more likely to effectively implement discharge planning at RSUD Kota Banda Aceh (Table 4).

Table 4: Multivariate Logistic Regression Analysis Using the Enter Method on the Association Between Discharge Planning Factors and the Implementation of Discharge Planning

Variable	*p*-value	OR (95% CI)	Interpretation
Interpretation	0.000	10.677 (4.074 – 27.984)	Most dominant factor
Communication	0.001	5.748 (2.010 – 16.436)	Significant
Time	0.001	5.213 (1.953 – 13.911)	Significant
Knowledge	0.027	2.955 (1.129 – 7.736)	Significant

Discussion

Communication

The results of this study indicate a significant association between nurse communication and the implementation of discharge planning (p = 0.000). These findings are consistent with previous studies, which have shown that effective communication between nurses and patients enhances understanding of the care plan and reduces the risk of hospital readmission. Conversely, ineffective communication may result in information discrepancies and hinder the discharge process.[15–17]

Time

Effective time management is strongly correlated with the implementation of discharge planning (p = 0.000). This finding aligns with previous studies emphasizing that sufficient time enables nurses to thoroughly educate patients and their families. Inadequate time, on the other hand, limits opportunities for discussion, education, and patient preparation prior to discharge, which may increase the risk of complications.[18,19]

Knowledge

Knowledge was also found to be significantly associated with the implementation of discharge planning (p = 0.000). This result is consistent with previous studies indicating that nurses with higher levels of knowledge are more thorough in providing education, formulating follow-up plans, and explaining warning signs post-discharge. Insufficient knowledge directly impacts adherence to discharge planning procedures.[20,21]

Motivation

Motivation emerged as the most dominant factor in the regression model (OR = 10.67). This finding aligns with previous research indicating that high levels of motivation enhance nurses' commitment to delivering care, including the education and documentation involved in discharge planning. Motivation serves as an internal driving force that influences behavior, engagement, and the successful implementation of discharge planning.[12,22]

Conclusion

This study demonstrates that individual nurse-related factors—namely communication, time management, knowledge, and motivation—are significantly associated with the implementation of discharge planning in the inpatient wards of RSUD Kota Banda Aceh. Among these variables, nurse motivation emerged as the most influential factor (OR = 10.68), indicating that intrinsic drive plays a critical role in ensuring effective discharge planning, whereby nurses are actively engaged in patient education, interdisciplinary coordination, and timely clinical decision-making.

Motivated nurses play a crucial role in effective discharge planning, enhancing patient education and understanding of post-discharge care. This not only improves patient satisfaction but also helps reduce complications and readmissions, highlighting the importance of fostering nurse motivation in delivering quality and continuous patient-centered care.

This study has several limitations. First, it was conducted in a single hospital, which limits the generalizability of the findings. Second, the use of a cross-sectional design prevents the establishment of causal relationships. Third, organizational factors such as managerial support or information systems were not included in the analysis. Lastly, the majority of respondents were young nurses with relatively short work experience, which may not fully reflect the depth of clinical practice in discharge planning.

The findings of this study highlight the need for managerial interventions to enhance nurses' work motivation through appropriate incentives and a supportive work environment. Hospitals should strengthen training programs focused on communication and time management, and improve discharge planning competencies through continuous education. From a policy perspective, a comprehensive review of discharge planning standard operating procedures is necessary, including the integration of multidisciplinary teams and an effective monitoring system. Effective discharge planning not only improves patient safety and service efficiency but also facilitates a smoother transition to independent care at home.

Recommendation: Future research is recommended to involve multiple hospitals to enhance the generalizability of findings and to compare the implementation of discharge planning across various organizational contexts. Additional variables such as organizational support, nursing leadership, workload, information systems, and workplace culture—factors that are likely to significantly influence discharge planning—should be considered. Furthermore, complementing the quantitative approach with qualitative studies is advised to gain deeper insights into the experiences of nurses, patients, and families regarding the discharge planning process, including perceived barriers and individual perceptions.

Ethical Clearance: This study has received ethical approval from the Meuraxa General HospitalEthics Committee under approval number 112/09/Etik-penelitian/2024.

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The Relationship between Symptom Severity and Uncertainty in Illness in Cancer Patients in Aceh

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Abstract

Objective: This study aims to determine whether there is a significant relationship between symptom severity and uncertainty in illness in cancer patients at one of the referral hospitals in Aceh province, Indonesia. Uncertainty in illness is a condition in which individuals have difficulty predicting, controlling, and understanding the development of their disease. In cancer patients, high symptom severity has the potential to increase uncertainty in illness.

Material and Methods: This study is a quantitative research using a correlational design with a cross-sectional approach. This study was conducted from January to February 2025 at one of the referral hospitals in Aceh province. The sample consisted of 142 women diagnosed with breast cancer, ovarian cancer, and cervical cancer who were selected using a purposive sampling technique. Data were collected using a questionnaire consisting of sociodemographic characteristics, MD Anderson Symptom Inventory (MDASI), and Mishel Uncertainty in Illness Scale (MUIS). For MUIS, the Cronbach's Alpha was 0.81. Data analysis utilized the Chi-square test to examine the association between categorical variables.

Results: The results showed that the majority of respondents (n=142) were patients with breast, ovarian, and cervical cancer. A total of 112 patients (78.9%) experienced a high level of uncertainty in illness, while 30 respondents (21.1%) experienced a low level of uncertainty in illness. Then out of a total of 142 respondents, 77 respondents (54.2%) experienced severe symptom severity, while 65 respondents (45.8%) experienced mild and moderate symptom severity. This shows that there is a significant relationship between symptom severity and uncertainty in illness ($p = 0.030$).

Conclusion: There was a significant relationship between symptom severity and uncertainty in illness ($p = 0.030$).

Recommendation: It is recommended that further research be conducted with longitudinal or mixed methods design to gain a deeper understanding of the dynamics of uncertainty in illness.

Keywords: Uncertainty; Cancer; Symptom; Severity

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Introduction

Cancer is one of the non-communicable diseases that is of serious concern globally due to its high morbidity and mortality rates. According to the World Health Organization WHO, (2023), cancer is still the leading cause of death worldwide. Data from the International Agency for Research on Cancer (IARC) in 2022 shows that in 2022 there will be around 20 million new cancer cases with 9.7 million deaths. The most common types of cancer worldwide are lung cancer (12.4%) and breast cancer (11.6%), followed by colorectal (9.6%), prostate (7.3%), and gastric (4.9%) cancers[1,2] 7 juta kematian di seluruh dunia, dengan kanker paru-paru dan payudara sebagai yang paling umum. Ketimpangan dalam beban kanker dan kematian terjadi antara negara-negara dengan indeks pembangunan (IPM).

Cervical cancer and ovarian cancer are also epidemiologically significant types of cancer. Cervical cancer ranks fourth globally with 662,301 new cases and 348,186 deaths, while ovarian cancer ranks eighth with 324,603 new cases in 2022[3]. Asia is recorded as the region with the highest burden of cancer, accounting for 49.2% of all global cancer cases (9,826,539 cases) and 56.1% of total cancer deaths[4].

In Indonesia, cancer is a serious public health problem. Based on the latest data from Globocan 2022, there were approximately 396,914 new cancer cases and 251,272 cancer-related deaths in Indonesia. Breast cancer remains the most common type of cancer among women[1,5], Specifically in Aceh Province, data from the Aceh Health Office 2023 report indicated 1,500 new cancer cases occurred throughout the year[4,6]

While specific incidence rates per 100,000 population for breast cancer in Aceh for the most recent year are not readily available from publicly accessible official sources like Globocan, the consistently high number of reported cases underscores the significant health burden of cancer in the province[7]. In addition to the physical impact, cancer patients also experience significant psychological burdens, including anxiety, depression, and stress, which can lower their overall quality of life[8]. This burden is even heavier when patients face uncertainty in illness related to their illness.

Uncertainty in illness is a situation when individuals are unable to predict, control, or understand the condition of the disease they are experiencing[9]. This condition often occurs in cancer patients, especially women, who are dealing with physical, emotional, and long-term medical changes. Uncertainty in illness has a negative impact on patients' mental health, productivity, and quality of life.

Several studies show that uncertainty in illness correlates with increased psychological stress, mental health disorders, and decreased quality of life. About 30–50% of cancer patients experience psychological stress, and among them, about 60% report experiencing uncertainty in illness[10,12] emotional distress, and uncertainty and examine the predictive value they have on the quality of life of advanced cancer patients. A prospective, multicenter study was conducted between February 2020 and May 2021 of individuals diagnosed with an advanced, unresectable neoplasm prior to initiating systemic antineoplastic treatment. Participants completed questionnaires to quantify fatigue, emotional distress, disease uncertainty, and quality of life. A linear regression analysis was performed to study the predictive QoL variables. The study population comprised 508 patients, 53.7% of whom were male and had a mean age of 54.9 years. The most common cancers were digestive (40.6%. Further, uncertainty in illness describes the individual's difficulty in understanding the meaning and impact of illness, which leads to feelings of loss of control, feelings of hopelessness, and disruption in adaptation to illness[10] emotional distress, and uncertainty and examine the predictive value they have on the quality of life of advanced cancer patients. A prospective, multicenter study was conducted between February 2020 and May 2021 of individuals diagnosed with an advanced, unresectable neoplasm prior to initiating systemic antineoplastic treatment. Participants completed questionnaires to quantify fatigue, emotional distress, disease uncertainty, and quality of life. A linear regression analysis was performed to study the predictive QoL variables.

The study population comprised 508 patients, 53.7% of whom were male and had a mean age of 54.9 years. The most common cancers were digestive (40.6%).

Material and Methods

Research design and setting

This study is a quantitative research with a correlational design and a cross-sectional approach. This study aims to explore the relationship between symptom severity and uncertainty in illness in cancer patients at one of the referral hospitals in the province of Aceh, Indonesia.

Population and sample

The population in this study was all female patients diagnosed with breast, ovarian, and cervical cancer at Aceh provincial referral hospitals during the period of October to December 2024, with a total known population of 220 patients. Sample selection was carried out using the purposive sampling technique, resulting in 142 respondents calculated using the Slovin formula. This sampling method was chosen due to time constraints for educational purposes.

The sample criteria consist of inclusion criteria and exclusion criteria. Inclusion criteria: 1) women who are ≥ 18 years old, 2) women diagnosed with breast cancer, ovarian cancer, and cervical cancer, 3) Patients with composmentis awareness, 4) Patients in stable and cooperative conditions, 5) Patients who can see, hear, and read (all participants in this study were literate, therefore illiterate participants were not an issue for data collection), and 6) Diagnosed with ≥ cancer 1 year. The criterion of being diagnosed for ≥ cancer 1 year was included to focus on patients who have had longer experience with their illness, as many cancer patients in the region unfortunately do not continue treatment beyond the initial diagnosis phase. Meanwhile, patients with mental/ psychological disorders and patients who were experiencing severe pain at the time of data collection were excluded from this study.

Data collection for this study was carried out from January to February 2025. The MD Anderson Symptom Inventory (MDASI) questionnaire was distributed to measure the severity of symptoms, consisting of 27 question items with a Cronbach's alpha of 0.80. Uncertainty in illness was measured using the Mishel Uncertainty in Illness Scale (MUIS) questionnaire, which consisted of 10 question items with a Cronbach's Alpha of 0.81. All procedures in this study were carried out after obtaining proof of passing the research ethics with Number 329/ETIK-RSUDZA/2024.

Statistical Analysis

Descriptive statistics (frequency and percentage) were used to summarize sociodemographic characteristics and the distribution of symptom severity and uncertainty in illness. Given that the variables in this study were categorical, the Chi-square test was used to examine the association between symptom severity and uncertainty in illness.

Results

Table 1: Distribution of Sociodemographicin Cancer Patients (n = 142)

No.	Sociodemographic	Frequency (f)	Percentage (%)
1.	Respondent Age		
	≤ 30 years old	3	2.1
	> 30 years old	139	97.9
2.	Educational background		
	Basic	4	2.8
	Secondary	117	82.4
	College	21	14.8

No.	Sociodemographic	Frequency (f)	Percentage (%)
3.	Work		
	Homemaker	107	75.4
	Civil servant	21	14.8
	Self employed	8	5.6
	Unemployed	6	4.2
4.	Income/month		
	≤ IDR 3,000,000.00	114	80.3
	> IDR 3,000,000.00	28	19.7
5.	Marital status		
	Unmarried	3	2.1
	Married	137	96.5
	Life/death divorce	2	1.4
6.	Types of Cancer		
	Breast cancer	118	83.1
	Ovarian cancer	22	15.5
	Cervical cancer	2	1.4
7.	Long diagnosed		
	≥ 1 year	36	25.4
	>2year	106	74.6
8.	Chemo cycle		
	Cycle I	8	5.6
	Cycle II	58	40.8
	Cycle III	34	23.9
	Cycle IV	19	13.4
	Cycle V	14	9.9
	Cycle VI	9	6.3
9.	Stage of cancer		
	II	5	3.5
	III	112	78.9
	IV	25	17.6

Table 2: Description of Symptom Severity and Uncertainty in Illness in Cancer Patients (n = 142)

Variables	f	%
Symptom Severity		
Mild and moderate symptoms	65	45.8
Severe symptoms	77	54.2
Uncertainty in Illness		
Low Uncertainty	30	21.1
High Uncertainty	112	78.9

Table 3: Relationship Between Symptom Severity and Uncertainty in Illness (n = 142)

Symptom Severity	Uncertainty in illness				Total		*p*
	Low		High				
	n	%	n	%	n	%	
Mild and moderate symptoms	19	29.2	46	70,8	65	100	0.030
Severe symptoms	11	14.3	66	85.7	77	100	

The results of the study showed that out of a total of 142 respondents, the majority were aged Over 30 years old, namely 139 respondents (97.9%). In terms of education level, as many as 117 respondents (82.4%) had a secondarylevel. In addition, 107 respondents (75.4%) were not working or had the status of housewives (IRT), and 114 respondents (80.3%) had an income of less than 3 million rupiah/month. Meanwhile, the marital status of 137 respondents (96.5%) was married. The majority of respondents diagnosed with breast cancer were 118 respondents (83.1%), and 106 respondents (74.6%) had been diagnosed with cancer more than 2 years ago. Among the respondents who underwent chemotherapy, the majority of respondents (40.8%) underwent the second cycle of chemotherapy and most of the respondents were in stage III cancer with a total of 112 respondents (78.9%).

A total of 142 cancer patients participated as respondents in this study, 77 respondents (54.2%) experienced severe category of symptoms, and 112 respondents (78.9%) experienced high level of uncertainty in illness. The results of the analysis indicated that among the 77 respondents with severe symptom severity, 66 (85.7%) experienced a high level of uncertainty. These findings suggest a significant association between symptom severity and uncertainty in illness ($p = 0.030$).

Discussion

Symptom severity is one of the key factors influencing patients' perception of their illness, particularly among individuals with chronic diseases such as cancer. Severe, persistent, or unpredictable symptoms often trigger uncertainty in illness, which refers to a patient's difficulty in understanding or interpreting their health condition.

According to Mishel's Uncertainty in Illness Theory, uncertainty arises when individuals are unable to clearly interpret bodily signals or medical information. Severe and fluctuating symptoms such as pain, extreme fatigue, and sleep disturbances serve as sources of ambiguity and can heighten uncertainty regarding prognosis and treatment effectiveness.

These symptoms may also disrupt patients' sense of self-control and contribute to psychological distress[9,13].

The results of this study indicated that the majority of respondents (97.9%) were over the age of 30. Most participants were married, identified as housewives, and were in an advanced stage of cancer (Stage III). Breast cancer emerged as the most prevalent diagnosis among respondents. Furthermore, the majority had been diagnosed for more than two years and were undergoing the second cycle of chemotherapy. These findings reflect a clinical context characterized by a high and complex symptom burden. Being a housewife, for instance, may exacerbate the severity of symptoms due to the added responsibilities of managing household duties and caring for family members. The symptom burden experienced by these patients likely extends beyond physical complaints to include psychological distress, both of which may contribute to heightened levels of uncertainty in illness.

This is supported by the findings of the study, which showed that more than half of the respondents (54.2%) were in the group experiencing severe symptom severity, and 85.7% of them reported a high level of uncertainty in illness. These results indicate a significant association between symptom severity and uncertainty in illness (p = 0.030). This suggests that the more severe the symptoms experienced, the higher the level of uncertainty perceived by cancer patients.

Severe symptoms such as chronic pain, extreme fatigue, sleep disturbances, and cognitive decline have a direct impact on the physical and psychological well-being of patients. When these symptoms are unpredictable or do not respond to treatment, patients may experience increased anxiety, stress, and even feelings of helplessness in dealing with their illness. Such conditions lead to a perceived loss of control over one's own body, which in turn exacerbates the experience of uncertainty.

Previous studies support these findings. Fardell et al. found that symptoms such as fatigue, cognitive impairment, and pain affect the work ability and social roles of cancer survivors, which are associated with uncertainty in social and economic domains[14]. Similarly, Büthe et al. reported that symptoms such as dry mouth and loss of appetite led to changes in eating patterns among older cancer patients, potentially triggering uncertainty related to nutritional status and overall health condition[15]. Guan emphasized that managing uncertainty is a critical component of patient care, as it can enhance the adaptation process, promote more effective coping strategies, and support the psychological well-being of both patients and their families[11].

Consistent with the findings of this study and supported by Hall et al. symptom severity is a significant factor contributing to increased uncertainty in illness among cancer patients. Hall and colleagues emphasized that greater uncertainty is associated with higher levels of fatigue, insomnia, and negative affect, particularly in younger breast cancer survivors, highlighting the critical impact of symptom burden on patients' psychological and physical well-being[16].

This is also in line with previous research, which states that uncontrolled symptoms are associated with increased emotional burden, anxiety, and depression, thereby exacerbating uncertainty[17]. Severely ill COVID-19 patients experienced a high level of uncertainty in illness, particularly related to ambiguous symptoms and a lack of information[18].

Wei et al. also found that lung cancer patients undergoing chemotherapy experienced a high symptom burden, which was associated with feelings of social alienation mediated by low social support and poor psychological conditions, ultimately contributing to increased uncertainty[19]. Safar added that symptom severity was negatively associated with the quality of life in cancer patients, emphasizing that symptom management plays a crucial role not only in addressing physical aspects but also in reducing uncertainty in illness[17]. Palliative care interventions were found to significantly reduce the severity of physical symptoms such as pain, dyspnea, and fatigue in advanced cancer patients, although psychological symptoms like anxiety and depression often persisted[20] and graded on a scale of 0 to 4 (0 = none, and 4 = extreme).

Based on the findings of this study and existing theoretical frameworks, symptom severity is a key factor that can increase uncertainty in illness among cancer patients. Therefore, it is essential for healthcare professionals to implement a comprehensive symptom management approach that includes both pharmacological and non-pharmacological interventions. Strategies such as cognitive-behavioral therapy, relaxation techniques, and therapeutic communication can assist patients in coping with symptoms and developing a more adaptive perception of their illness.

A holistic approach to symptom management is expected not only to reduce the physical burden experienced by patients but also to lower the level of uncertainty in illness, thereby improving the overall quality of life of individuals living with cancer.

Conclusion

There was a significant relationship between symptom severity and uncertainty in illness ($p = 0.030$).

Limitations of The Study

This study has limitations in assessing the causal relationship due to the design used. In addition, other factors such as social, cultural, and economic conditions have not been considered, and the absence of long-term data limits the understanding of changes in uncertainty in illness over time. Further studies are recommended using a more thorough design and more diverse methods for more in-depth results.

Recommendation

It is recommended that further research be conducted with longitudinal or mixed methods design to gain a deeper understanding of the dynamics of uncertainty in illness.

Ethical Consideration

All procedures in this study were carried out after obtaining proof of passing the research ethics with Number 329/ETIK-RSUDZA/2024.

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Temperature Recording In Neonates by Non-Contact Thermometer Versus Routine Digital Thermometer - The Best Modality?

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Abstract of the Study

Introduction: Measurement of temperature in neonates should be accurate, reliable and reproducible, considering that they have a limited ability to regulate their own temperature. There is no ideal thermometer to measure temperature, however, there has been a constant endeavour to find more accurate and non-invasive means of measurement. The present study was conducted to find whether Non-Contact Infrared thermometers were as accurate as Digital Axillary thermometers in measuring temperatures in neonates.

Methodology: This was a comparative diagnostic study, carried out in the maternity unit of a tertiary care hospital over a period of 6 weeks. A total of 154 neonates were recruited in the study through consecutive sampling and their temperatures recorded using Non-Contact Infrared Thermometer (NCIT) on forehead and Digital Axillary Thermometer (DAT) on axilla simultaneously.

Results: The average temperature recording on forehead using NCIT and axilla using DAT, was in the range of 36 – 37°C, with the NCIT showing a higher recording as compared to the DAT. The mean difference between the two modalities was –0.46°C. A Bland-Altman plot analysis was done, in which majority of readings had wide variation, falling beyond the upper (0.57°C) and lower (–1.49°C) limits. A linear regression plot also showed a positive correlation between NCIT on forehead and DAT on axilla, with absolute R value = 0.2, which showed a weak correlation between the two.

Conclusion: It was concluded that NCIT measurements on forehead are not as accurate as DAT measurements on axilla. However, a larger study, is needed to extrapolate these findings to the general population.

Keywords: Temperature, Neonates, Non-Contact Infrared Thermometer (NCIT), Digital Axillary Thermometer (DAT)

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Introduction and Background

One of the significant components of the holistic care in hospitals for all neonates is Temperature management. Body temperatures above or below normal ranges may indicate some underlying diseases or clinical deterioration and it should be identified within a timely manner. Maintaining a normal body temperature assists in optimizing metabolic processes and bodily functions.[1]

The estimated rate of heat loss in a newborn is approximately 4 times that of an adult. The main reason for the elevated rate of heat loss is evaporation of amniotic fluid from the surface of the skin once the wet newborn moves from the consistently warm uterine environment to a cooler, drier labour room. Under the usual delivery room conditions (20–25°C), an infant's skin temperature falls approximately 0.3°C/min, and core body temperature decreases approximately 0.1°C /min during the period immediately after delivery; these rates generally result in a cumulative loss of 2–3°C in deep body temperature (corresponding to a heat loss of approximately 200 kcal/kg). The heat loss occurs by 4 mechanisms: convection of heat energy to the cooler surrounding air, conduction of heat to the colder materials touching the infant, heat radiation from the infant to other nearby cooler objects, and evaporation from skin and lungs. This heat loss leads to hypothermia, which has been defined by the WHO as body temperature below the normal range (36.5°C–37.5°C) and has been sub-classified into three grades: mild (36.0°C–36.5°C), moderate (32.0°C–35.9°C), and severe (<32.0°C) hypothermia.[2,3,4]

Hence, measurement of temperature in neonates should be accurate, reliable and reproducible, considering that they have a limited ability to regulate their own temperature. It should be simple and as non-invasive as possible.

The rectal method using digital thermometers is generally considered the "gold standard". Digital devices, which are placed in the axilla, remain a common option for use in neonatal units. The main disadvantage of these devices is the time it takes to obtain an accurate reading: up to three minutes, depending on the device.

Dante A et al evaluated the interchangeability of forehead, tympanic and axillary thermometers in 433 children. Comparing the measurements of each type of thermometer with the overall average of the three measurements recorded as the virtual gold standard, Bland Altman analysis highlighted that tympanic thermometer more closely resembled the reference temperature, indicating its preferential use in paediatric clinical practice.[12]

Smith J et al tried to establish if using a non-contact thermometer would be in agreement with the axilla method of temperature taking by undertaking a comparative design used to evaluate level of agreement between Infrared (IR) non-contact thermometer and digital thermometer (via axilla) in term and preterm infants admitted to the neonatal unit, where the limits of agreement of Infrared (IR) non-contact thermometer with Axilla measurements were found wider and therefore its use in the neonatal population was not recommended.[13]

However, a study conducted by Sugawara S et al concluded that the non-contact infrared thermometer using in the neonatal room of obstetrics was not only practical but also very useful. This method was hygienic, had a short measurement time and did not disturb the quality of daily life of the newborns.[11]

Sener S et al, on the contrary suggested that easy application may lead non-contact thermometry to be the preferable method for healthcare providers but large agreement limits with axillary thermometry should be considered to bring it into clinical practice.[14]

With so much ambiguity in the process of assessment of the vital sign, there is no ideal thermometer yet present in the clinicals for recording temperatures. Hence there has been a constant endeavour to find more accurate and non-invasive means of measurement.

The research question that arises here is, which method of recording temperature in neonates is better and effective: non-contact infrared thermometer recording on forehead or digital axillary temperature recording.

Primary Hypothesis

H_0: There is no difference in recordings of temperature between non-contact infrared thermometer on forehead and digital axillary thermometer.

H_1: There is significant difference in recordings of temperature between non-contact infrared thermometer on forehead and digital axillary thermometer.

The aim was to compare the efficacy of non-contact infrared thermometers in measuring neonatal temperature with respect to digital axillary thermometers.

Objectives

1. To record the temperature of neonates with non-contact infrared thermometer on forehead.
2. To record temperature of neonates with digital thermometer in the axilla.
3. To compare the temperature recorded on the forehead using infrared thermometer to axillary temperature using digital thermometer in neonates.

The advantages foreseen for this study are:

1. Non-invasive method will help in less handling of the babies.
2. Prevent interruption of sleep hence aiding to promotion of health
3. Less chances of infection
4. If the accuracy is found to be compatible, it can be used in labour room, NICU, PICU and pediatric settings.

Problem Statement

A study to compare the temperature recording on forehead by a non-contact infrared thermometer vs routine digital axillary temperature recording in neonates admitted to a tertiary care center in Western Maharashtra.

Ethical Consideration

This study was formulated taking utmost care to abide by the guiding ethical principle after being thoroughly scrutinized by the Institutions ethical committee (IEC/2021/378 dt 17 Apr 2021 Armed Forces Medical college, solapur road, Pune- 411040) and the hospital staff in direct contact with the target population in the long run.

Methodology

The approach adopted for the study was quantitative with a diagnostic comparative design.

The variables included

Independent variables: Non-contact infrared thermometer (NCIT) and Digital axillary thermometer (DAT).

Dependent variables: Temperature recording of neonates using NCIT or DAT

Research variables: Age (Hours of life), Gender, Weight at birth and Mode of delivery

The study was conducted in the maternity unit of a selected tertiary care hospital where the target population were term neonates fulfilling the inclusion and exclusion criteria. During the six weeks of data collection from 1st DEC 2021 to 15th JAN 2022, the available term neonates having no complications at birth and roomed in with mothers were considered as accessible population

Sample size

Determining the appropriate sample size for this study is essential component of the study protocol. An adequate sample size ensures that the study will yield reliable information. Sample size for the present study was calculated based on the pilot study conducted by the researcher during November 2021 on 30 neonates with the same inclusion and exclusion criteria.

Sample size is calculated for Bland Altman Plot

1. Type I error (alpha) = 0.01
2. Power (1- Beta) = 0.80
3. Expected mean difference between axillary and NCIT = 0.47°C
4. Expected Std deviation of difference between the two method = 0.34°C
5. Maximum allowed difference between the two methods = 1.3°C
6. Sample Size **153.6 neonates**

However, A total of 154 neonates were chosen by consecutive sampling by Medcalc Software, based on the pilot study conducted by the researcher during November 2021 on 10 neonat The inclusion criteria was all Healthy term newborns (>37 completed POG) and exclusion criteria were Neonates with any metabolic disorders or requiring NICU admission.

Material

The instruments used in the present study were chosen after an extensive market survey for basic safety and essential performance of clinical thermometers for body temperature measurement.

1. Non Contact Infrared Thermometer (NCIT): Omron MC720 Infrared thermometer, manufactured by Omron Healthcare Co Ltd, Japan. Digital Axillary Thermometer (DAT):
2. Omron MC-246 Digital thermometer, manufactured by Omron Healthcare Co Ltd, Japan.

Reliability and validity of both the instruments were ensured for the data collection

Method of measurement: Those who fulfill the inclusion criteria and willing to participate were taken up for the study after receiving a written informed consent from their parents.after preparing the basic information sheet, One reading of axillary temperature (via DAT) and three readings of forehead temperatures (via NCIT) were taken for each neonate. The axillary temperature, which is considered the clinical standard was then compared with the maximum forehead temperature recorded by the NCIT for the neonate, for the purpose of assessing the replicability.

Data Analysis Procedure and Disscussion

1. The data collected using the methodology is entered in an excel sheet and was imported to SPSS version 27 for the statistical analysis.
2. Frequency and percentage distribution was used for socio-demographic variables
3. Bland- Altman test was used for evaluating the replicability of NCIT with DAT.
4. Karl Pearson's correlation coefficient was used to determine the correlation between the DAT reading and the NCIT reading
5. P value of <0.01 was considered to be statistically significant

Table 1.1: Socio-demographic data of the neonates

Variables	Parameters	Total samples	
		f	%
Age (in completed hours of life)	< 24	39	25.3
	24–72	59	**38.3**
	>72	56	36.4
Sex	Male	98	**63.6**
	Female	56	36.4
	DSD	0	0
Weight (in grams)	<2500	27	27.5
	2500–3500	109	**70.8**
	>3500	18	11.7
Mode of Delivery	Normal Vaginal delivery	115	**74.4**
	Vacuum/ Forceps	0	0
	LSCS	39	25.6

The average age of neonates in the study was 24–72 hours, comprising 38% of the total samples. However, there were almost an equal number (36%) of neonates, who were more than 3 days old (Table 1.1).

Majority of the neonates were males, forming 64 % of the study population, whereas the rest 36% of the population were females. None of the neonates had ambiguous genitalia, belonging to the differences in sex development category (Table 1.1). 70.8% of the neonates had a birth weight between 2.5 to 3.5 kgs (Table 1.1). Compared to the study by Uslu S et al who had 51.4% neonates with birth weight more than 2.5 kg, this study had a greater number of neonates in the same category. This could be explained by the fact that our inclusion criteria had only term neonates, while Uslu et al included preterm neonates as well.[5]

Another variable which did not turn up on any of the search findings was that of mode of delivery.

Out of 154 neonates, 74.7% were born by spontaneous vaginal delivery, none requiring any instrumental support like vacuum or forceps, while 25.3% neonates were born via caesarean section (Table 1.1) While it was presumed that mode of delivery, especially instrumental deliveries might alter accurate forehead temperature measurements, the researcher could not find any study which had assessed this parameter.

Relationship of these research variables with the dependent variables was found to be statistically insignificant when tested with independent t test and ANOVA.

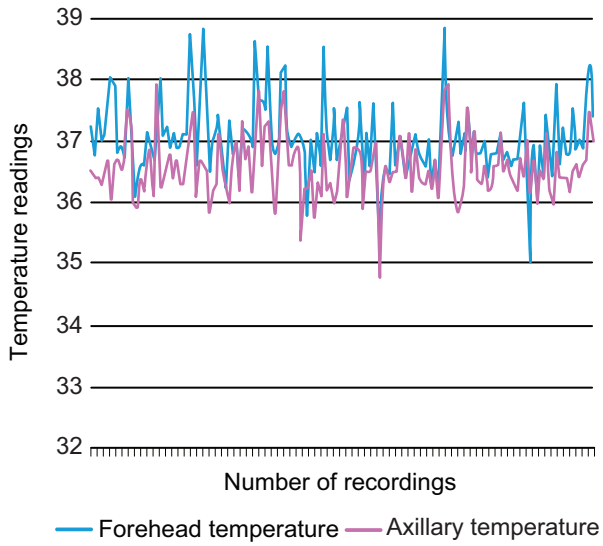

Figure 2.1. Comparison of Forehead Temperature using NCIT and Axillary Temperature using DAT

Graphically, it was seen that the forehead temperature using NCIT were approximately 1°C higher than the axillary temperature using DAT, and this difference was nearly constant (Fig 2.1).

In this study, it was found that the average range of NCIT readings was between 36–37°C, while that of DAT was in the range of 35–38°C. These readings were consistent and no clinical difference was observed between patients with different weights or gestational age. The mean difference between axillary and forehead temperatures was –0.46°C.

These findings were similar to the study done by Uslu S et al.[5] In a study conducted by Robertson-Smith J et al, the mid-forehead temperature recordings had a higher reading compared to digital axillary readings, with a clinically non-significant difference in the temperature readings between the two modalities.[6] This was in contrast to the findings of the present study

A one sample t-test was done to compare if the difference between NCIT and DAT readings was statistically significant. It was found that the t-value was more than the table value. Hence, although clinically non-significant, the difference between the two modalities was statistically significant (Table 1.2), verifying the rejection of null hypothesis at p value 0.000.

Table 1.2: One sample t test

						Test value= 0	
	t value	**df**	**Significance (2- tailed)**	**Mean difference**	**SD**	**95% CI of the difference**	
						Lower	**Upper**
Mean Difference	**6.513**	153	**0.000**	0.25130	0.4788	0.1751	0.3275

***'t' table value- 1.96 (df= 153)**

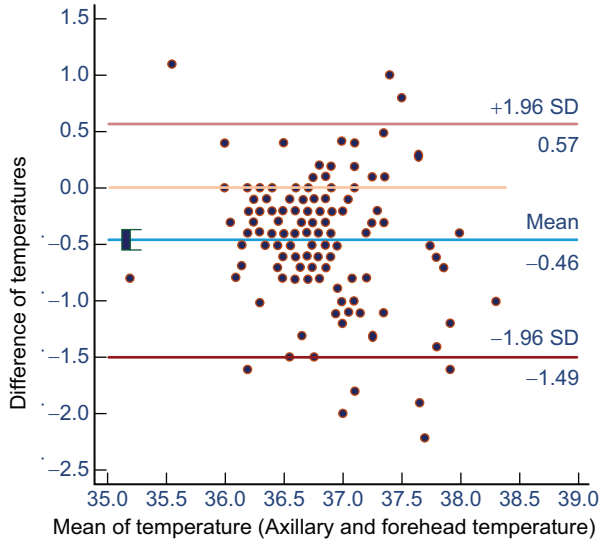

Figure 2.2. Bland Altman plot for agreement of forehead temperature recordings and axillary temperature recordings

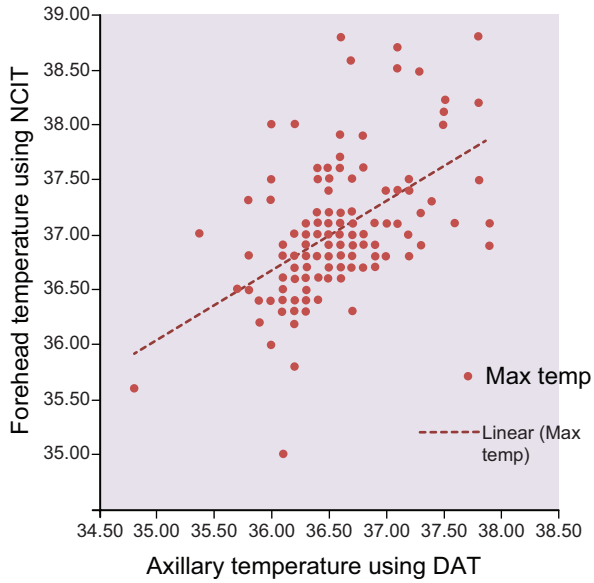

Figure 2.3. Linear Regression between Forehead temperature using NCIT and Axillary temperature using DAT

The Bland Altman graph was plotted to find a large number of observations to be outliers. As the observations showed a wide scatter, going beyond the limits of 0.57 and 1.49, it was suggestive of the fact that there is a significant difference between the measurements of the temperature by the two methods (Fig 2.2).

These findings were similar to the study conducted by Apa H et al, which mentioned that the NCIT was found as a useful tool for screening of fever, but had a higher degree of variation from axillary temperature.[7]

However, other studies by Uslu et al, Robertson-Smith et al, Thiagarajan S et al, in their study also conducted a Bland-Altman analysis to show a moderate agreement between NCIT and axillary temperatures by Bland-Altman analysis . Chiappini E et al also undertook both Bland-Altman analysis and receiver operating characteristic curve to determine the best threshold limits for both axillary and NCIT. Their results showed good sensitivity and specificity of NCIT.[5,6,8,9]

The present study also undertook a Pearson's correlation where the analysis showed a consistent linear correlation between DAT and NCIT measurements (Fig 4.3.1). A similar correlation was also found in a study by Sugawara S et al and Hayward G et al.[10,11]

Linear regression was also done in the study to predict the value of forehead temperature with the help of axillary temperature, after the correlation was established. A weak regression coefficient was found in the study (Fig 2.3).

Findings of the Study

The findings in the study suggests that NCITs may not be interchangeable with digital axillary thermometers for measuring temperature in neonates given the wide limits of agreement and poor replicability.

Implications of the Study

Nursing Practice

The NCIT cannot replicate the DAT (clinical standard). Hence routine monitoring of axillary temperature using DAT should be continued for ensuring quality care in neonatal population.

Nursing Administration

The nurse administrator's is responsible to restrict the replacement of DAT by NCIT and ensure standard practices in nursing neonates in maternity and neonatal wards, unless proven otherwise.

Nursing Education

Students can be educated about the various modalities of thermometry available, and to use the appropriate method depending on the clinical scenario faced.

Limitations of the Study

A non-randomised method of sample collection was applied in the study due to the short span of data collection, which may limit the generalizability of the findings to other populations and settings.

Furthermore, this study did not account for potential confounding variables, such as ambient temperature and humidity, which could impact the accuracy of NCIT

Recommendations from the Study

The researcher found that while the findings correlate with most of the other studies in saying that NCIT is not as accurate as DAT, a larger study with more subjects and a longer time duration for data collection is recommended to extrapolate and generalize the findings of the study.

The target population can be broadened to find the accuracy of thermometers on different age groups of children.

Modifying the research design to a mixed method, to identify other factors affecting temperature measurements can also be considered.

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Original Article

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The Relationship Between Professional Identity and Work Motivation Among Nurses at The Maternal and Child Hospital in Aceh Province

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Abstract

Objective: This research explores the link between professional identity and work motivation among nurses at the Maternal and Child Hospital in Aceh. It examines how various aspects of professional identity such as ethics, knowledge, leadership, and professional behavior affect nurses' motivation in their work environment. The primary objective is to assess whether a more developed professional identity contributes to increased work motivation. The hypothesis posits that a stronger professional identity across these dimensions is positively related to greater motivation at work. The findings indicate a significant and robust correlation between the domains of professional identity and work motivation. These results provide valuable evidence for creating strategies aimed at enhancing nurses' professional identity, boosting motivation, and ultimately improving the quality of patient care and healthcare services.

Material and Methods: This study employed a correlational design conducted from January to March 2024 at the Maternal and Child Hospital of Aceh Province. A total of 142 implementing nurses were selected using total sampling based on inclusion criteria such as active registration, a minimum of one year of experience, and voluntary participation. Data were collected using two validated instruments: the Nurse Professional Identity Scale (NPIS), measuring four domains of professional identity (values and ethics, knowledge, leadership, and professional comportment) with a Cronbach's alpha 0,96, and the Unified Motive Scale (UMS) showed a Cronbach's alpha of 0,95, indicating strong reliability for both scales. which assesses three components of work motivation (achievement, power, and affiliation) based on McClelland's Human Motivation Theory. Data analysis was performed using chi-square tests to examine bivariate relationships and also using Pearson correlation to assess the strength of the relationship.

Results: Of the 142 nurses surveyed, 65,5% reported high work motivation. Significant associations were found between work motivation and values and ethics ($p = 0,002$; $r^2 = 0,753$), knowledge ($p = 0,003$; $r^2 = 0,915$), leadership ($p = 0,012$; $r^2 = 0,989$) and professional comportment ($p = 0,001$; $r^2 = 0,963$).

Conclusion: This study highlights a significant and strong relationship between professional identity and work motivation. The domains of professional identity, such as values, knowledge, leadership, and comportment, are closely associated with increased work motivation. Strengthening these domains can enhance motivation and improve job performance.

Keywords: professional, identity, motivation, nurse, hospital

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Introduction

Nurses play a vital role in healthcare systems, delivering continuous, patient-focused care in various clinical environments. Their responsibilities go beyond routine care to encompass clinical decision-making, advocating for patients, providing health education, and collaborating within multidisciplinary teams. Consequently, nurse motivation is crucial for ensuring high-quality healthcare, patient satisfaction, and organizational effectiveness. However, many healthcare facilities in Indonesia face ongoing challenges with nurse motivation, influenced by factors such as heavy workloads, limited professional growth opportunities, inadequate pay, and insufficient organizational support. These challenges not only impact individual nurse performance but also contribute to higher turnover and diminished care quality.

One important but less studied factor affecting nurse motivation is professional identity, which refers to the integration of professional values, norms, knowledge, and ethical conduct shaping nurses' perceptions of their roles within healthcare. A well-developed professional identity is associated with greater job satisfaction, lower burnout rates, improved teamwork, and stronger ethical commitment. International research indicates that nurses with a clear and confident sense of their professional identity tend to exhibit greater resilience, motivation, and institutional loyalty.

Despite its importance, professional identity has received limited attention in the Indonesian healthcare setting, especially regarding its influence on nurses' motivation. Addressing this gap is essential given the persistent issues in nurse retention and performance. This study therefore investigates the relationship between professional identity and work motivation among nurses at the Maternal and Child Hospital in Aceh Province. The results aim to provide evidence to guide policies and management practices that improve nurse well-being and job performance.

Materials and Methods

Research design and setting

This study employed a quantitative correlational design conducted from January to March 2024 at the Maternal and Child Hospital in Aceh Province, Indonesia, a regional referral center specializing in maternal and pediatric care. This study was conducted after completing the ethical review process, which was approved by the Ethics Committee of Universitas Syiah Kuala, Banda Aceh, under approval number 112017110924. All respondents provided written informed consent to participate in this study.

Population and sample

The study population comprised all 149 implementing nurses working at the Maternal and Child Hospital in Aceh Province. Using total sampling, 142 nurses who met the inclusion criteria, holding valid nursing registration, having at least one year of work experience, and consenting to participate were recruited as the study sample.

Procedure of study

Prior to data collection, ethical approval was obtained from the Universitas Syiah Kuala Ethics Committee, and permission was secured from the hospital administration. The researchers coordinated with the heads of nursing units to facilitate the distribution of questionnaires. Eligible nurses were informed about the study's objectives, procedures, and their rights as participants, including confidentiality and voluntary participation. Written informed consent was obtained from all participants before the questionnaires were administered. The data collection involved two validated instruments: the Nurse Professional Identity Scale (NPIS) and the Unified Motive Scale (UMS), which were distributed in printed form during work shifts to minimize disruption. Completed questionnaires were collected by the nursing unit heads or directly by the research team. The data collection process spanned from January to March 2024. Following collection, all questionnaires were checked for completeness before data entry and analysis.

Results

The respondents are predominantly female (78.9%) with an average age of 37.5 years and an average length of service of 9.22 years. Most are married (79.4%) and hold a Bachelor of Nursing (44.4%) or a Diploma III in Nursing (43.8%). The majority work as Clinical Nurse Level III (44.4%), followed by Level 1 (34.4%). Regarding employment status, 56.3% are government employees with work agreements, while 26.9% are civil servants. This demographic suggests a well-experienced, female-majority workforce with a strong preference for government employment.

Nurses who exhibited strong professional identity characteristics such as strong values and ethics, knowledge, leadership, and professional comportment demonstrated higher levels of work motivation. Specifically, those with strong values and ethics had 52.6% reporting high motivation, compared to 23.3% with weak values and ethics, with a highly significant ($p = 0,002$; $r^2 = 0,753$). Similarly, strong knowledge ($p = 0,003$; $r^2 = 0,915$) and leadership ($p = 0,012$; $r^2 = 0,989$) were associated with higher motivation, respectively. The highest correlation was observed for strong professional comportment, where 54.5% of nurses with strong comportment reported high motivation ($p = 0,001$; $r^2 = 0,963$). See table 1.

Table 1: Demographic and Professional Characteristics of Respondents

Demographic and Professional Characteristics	f	%	$\bar{X} \pm SD$
Age	-	-	37,5 ± 6,836
Length of Service	-	-	9,22 ± 5,649
Gender Male Female	 30 112	 21,1 78,9	-
Marital Status Married Single	 127 15	 79,4 9,4	-
Education Bachelor of Nursing Diploma III in Nursing Master of Nursing	 71 70 1	 44,4 43,8 0,6	-
Clinical Nurse Level Clinical Nurse Level 1 Clinical Nurse Level III Clinical Nurse Level III	 55 16 71	 34,4 10,0 44,4	-
Employee Status Civil Servant Government Employee with Work Agreement Contract Staff	 43 90 9	 26,9 56,3 5,6	-

Table 2: The Relationship between the Variable of Professional Identity and Nurses' Work Motivation

Variable of Professional Identity	Nurses' Work Motivation				f	%	p	r^2
	High		Low					
	f	%	f	%				
Strong Value and Ethic	41	52,6	37	47,4	78	100	0,001	0,753
Weak Value and Ethic	15	23,3	46	76,6	64	100	0,001	
Strong Knowledge	38	52,1	35	47,9	73	100	0,003	0,915
Weak Knowledge	18	26,1	51	73,9	69	100	0,003	
Strong Leadership	33	41,3	47	58,8	80	100	0,012	0,989
Weak Leadership	23	37,1	39	62,9	62	100	0,012	
Strong Professional Comportment	42	54,5	35	45,5	77	100	0,001	0,963
Weak Professional Comportment	14	21,5	51	78,5	65	100	0,001	

Discussion

This study examined the association between professional identity and work motivation among nurses at the Maternal and Child Hospital in Aceh Province. The findings revealed that specific facets of professional identity namely values and ethics, knowledge, leadership, and professional comportment are positively correlated with nurses' motivation levels. These results offer valuable insights into how various elements of professional identity contribute to nurse motivation within hospital settings, reinforcing and extending existing knowledge in nursing and healthcare management. The observed positive correlation between values and ethics and motivation aligns with prior studies emphasizing that adherence to professional values and ethical standards is fundamental in cultivating intrinsic motivation among healthcare practitioners[1–3]. Nurses who internalize such principles tend to exhibit greater commitment and dedication, which directly enhances their motivation to provide high-quality care. This underscores the imperative for healthcare organizations to strengthen ethical education and foster environments where professional values are actively upheld, thereby reinforcing a robust professional identity that invigorates nurses in their practice.

Similarly, the significant link between knowledge and motivation supports evidence suggesting that continuous professional development and skill acquisition enhance nurses' confidence and motivation[4,5]. Given the complexities of clinical practice, ongoing education equips nurses to effectively manage patient care challenges, which is pivotal in sustaining motivation and job satisfaction. This is consistent with findings by Kohnen et al who identified that a supportive professional climate and recognition from peers and supervisors significantly enhance nurse engagement and intrinsic motivation. As professional comportment reflects both internalized identity and social reinforcement mechanisms, fostering a workplace culture that emphasizes respect, recognition, and professional interaction is crucial for maintaining motivation[6].

Knowledge and motivation are strongly interconnected, which could be attributed to contextual factors such as diverse perceptions of leadership roles, limited opportunities for leadership development, or insufficient training within the nursing workforce. The literature underscores the essential role of effective nursing leadership in empowering staff and fostering motivation[7–9]. suggesting that the absence of association in this study indicates a gap in leadership development programs and the need to clarify and expand leadership roles to better support nurse motivation. Demographically, the majority of respondents were female (78.9%), with a mean

age of 37.5 years and an average tenure of 9.2 years, mirroring global nursing workforce trends where age and experience influence professional identity and motivation[10]. Experience gained through years of service likely strengthens professional identity and enhances intrinsic motivation as nurses develop greater clinical expertise and role competence.

The concept of professional identity is closely linked to work motivation, with a significant relationship observed between various components of professional identity, such as values, ethics, knowledge, leadership and comportment, and the motivation levels of nurses[2,11,12]. Nurses who exhibit a stronger professional identity tend to show higher motivation in their work. These findings underscore the direct impact that a well-developed professional identity has on enhancing intrinsic motivation and job satisfaction among nurses. This highlights the critical need for healthcare organizations to prioritize the cultivation of a strong professional identity, as it plays a pivotal role in improving nurse motivation and, consequently, the quality of patient care.

Practically, these findings advocate for healthcare administrators and policymakers to prioritize the reinforcement of professional identity as a strategy to improve nurse motivation and consequently, care quality[13–15.] This can be achieved through structured and ongoing professional development programs targeting ethical standards, clinical knowledge, and professional comportment. Additionally, cultivating a supportive and respectful workplace culture that values professional behavior and promotes recognition can sustain motivation. Policies encouraging nurse participation in decision-making and equitable compensation are also essential to motivate and retain skilled nursing personnel. Although this study provides valuable evidence regarding the influence of professional identity on motivation, its cross-sectional design limits causal inferences, and findings may not be generalizable beyond the study setting. Longitudinal research is recommended to explore temporal changes in professional identity and motivation, while qualitative studies could offer richer contextual understanding of nurses' experiences.

In conclusion, this study underscores the pivotal role of values and ethics, knowledge, leadership and professional comportment in fostering nurse motivation, while revealing underexplored potential in leadership development. Focused interventions in these areas could enhance motivation, job satisfaction, and ultimately patient outcomes. These insights contribute to a deeper understanding of nursing workforce dynamics and inform actionable strategies for healthcare organizations aiming to optimize nurse performance and retention.

Conclusion

In conclusion, this study underscores the strong and significant association between professional identity and work motivation among nurses at the Maternal and Child Hospital in Aceh Province. The key dimensions of professional identity, including values and ethics, knowledge, leadership and professional comportment, are closely linked to higher motivation levels. These findings highlight the importance of healthcare organizations reinforcing these components through ongoing education and ethical practices to enhance nurse motivation and job satisfaction. Overall, fostering a well established professional identity is crucial for improving nurse motivation, retention, and the quality of patient care. Future research should further investigate the evolving relationship between professional identity and motivation in nursing practice.

Limitations of The Study

This study is limited by its cross-sectional design, which restricts causal conclusions, and its single-hospital setting, which may affect generalizability. The use of self-administered questionnaires may introduce response bias, and the non-significant leadership findings could be due to unmeasured contextual factors.

Future Research Recommendations

Qualitative studies are recommended to deepen understanding of nurses' perspectives, especially on leadership's role in motivation. Investigating interventions to enhance professional identity and motivation is also suggested.

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Knowledge on Antimicrobial Resistance and Stewardship in Undergraduate Nursing Students: A Cross-sectional study

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Abstract

Background: Antimicrobial resistance (AMR) is a global health threat, causing increased morbidity, mortality, and healthcare costs. Effective antimicrobial stewardship (AMS) is crucial to limit its spread. Nurses play a critical role in addressing AMR, but knowledge deficiency among undergraduate nursing students can hinder their preparedness for stewardship responsibilities. This study aims to determine the knowledge level of undergraduate nursing students about antibiotics, AMR, and AMS, addressing the challenge of knowledge deficiency among these students.

Methods: A cross-sectional study was conducted on 140 undergraduate nursing students, using a self-administered questionnaire to collect demographic data and knowledge about antibiotics, antimicrobial resistance, and antimicrobial stewardship. Statistical analyses were performed using SPSS version 20.0, with descriptive statistics providing an overview of participants' knowledge and chi-square tests investigating associations between factors like age, gender, semester, and residence with knowledge.

Results: Participants had the mean knowledge score of 7 ± 2.067, and none of the participants had adequate knowledge, 40.7% had moderately adequate knowledge, and 59.3% had inadequate knowledge. Semester of study was the only factor that had significant relations with knowledge on antimicrobial resistance and stewardship ($p = 0.010$).

Conclusion: The study reveals significant gaps in undergraduate nursing students' understanding of antibiotics, antimicrobial resistance, and stewardship, highlighting the need for comprehensive curricular reform and innovative educational strategies to prepare future nurses for addressing antimicrobial resistance and strengthening healthcare systems.

Keywords: Antimicrobial resistance, Antimicrobial stewardship, Nursing undergraduates, Nursing education, Knowledge assessment

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Introduction

Antimicrobial resistance (AMR) is a global health threat that makes infections more difficult to treat, leading to increased morbidity, mortality, and healthcare expenses. AMR is the ability of microbes, including bacteria, viruses, fungi, and parasites, to resist the action of drugs that once killed them or hindered their growth. The overuse and misuse of antibiotics are key drivers of this issue. The World Health Organization predicts that without effective strategies, AMR could result in 10 million deaths annually by 2050, disproportionately affecting low- and middle-income countries, including Southeast Asia.[1-5] This region faces challenges like easy antibiotic availability without doctor's prescription and poor infection control, leading to a high prevalence of multidrug-resistant organisms.[6] Deaths due to AMR are on the rise, estimated to exceed cancer and diabetes death rates.[2,3] In 2019, AMR was directly responsible for over 1.2 million deaths.[5]

In response to the rising crisis of antimicrobial resistance, Antimicrobial Stewardship (AMS) has come up as a crucial strategy to combat AMR, aiming to optimize antibiotic use and improve patient safety.[7] Nurses, as frontline healthcare providers, play a vital role in ensuring the appropriate use of antibiotics, educating patients on proper usage, and collaborating with interdisciplinary teams to promote effective antimicrobial practices. Their frequent patient contact and direct involvement in infection prevention make them essential for the successful implementation of AMS strategies.[8,9] However, to be effective in this role, nurses must have a thorough understanding of AMR, appropriate prescribing protocols, and robust infection prevention and control measures.

Despite the pivotal role nurses play, numerous studies consistently show that nursing students often have significant gaps in their knowledge regarding AMR and AMS. This deficiency directly hinders their ability to contribute effectively in combating AMR. A study in South Africa revealed that even graduating nursing students, despite completing their clinical training, lacked fundamental knowledge of antibiotics and AMR principles.[10] Similarly, research from Spain found a noticeable lack of AMR awareness among nursing students, identifying shortcomings in their nursing curriculum.[11] In Asia, studies from Jordan and India have also reported low to moderate baseline knowledge levels, with improvements only occurring after targeted educational programs were implemented.[12-14] These collective findings from various global contexts point to a widespread gap in nursing education regarding the skills needed to address AMR and implement AMS strategies effectively.

This study was conducted to assess the knowledge of antibiotics, AMR and AMS among undergraduate nursing students in India with an aim to gain valuable insights that can inform new educational interventions, ultimately helping to prepare nurses for their critical role in AMS and, in turn, in preventing the rise and spread of drug-resistant pathogens.

Methods

Study Design

This study utilized a cross-sectional design by performing a secondary analysis of baseline data. This data was originally gathered for a separate randomized controlled trial (RCT), titled "Impact of Self-Directed Learning Strategy, an Innovative Method in Nursing Undergraduates: A Randomized Controlled Trial." The primary RCT, which was registered with the Clinical Trials Registry - India (CTRI) (registration number: CTRI/2024/01/061599), aimed to compare the effectiveness of game-based learning versus traditional self-directed learning methods in enhancing knowledge and self-directed learning abilities among nursing undergraduates over a 12-week period.[15]

Our strategic decision to conduct a secondary analysis of the pre-intervention data allowed us to address a different, though related, research question. This approach enabled us to efficiently use an existing high-quality dataset to assess students' prior knowledge of antibiotics, antimicrobial resistance (AMR), and antimicrobial stewardship (AMS). By identifying these knowledge gaps, we can inform the development of future educational strategies, independent of the original RCT's primary focus on intervention outcomes. The study took

place from January to April 2024 at Smt. Radhikabai Meghe Memorial College of Nursing (SRMMCON), a constituent nursing college of the Datta Meghe Institute of Higher Education & Research in India.

Participants

The study included 140 undergraduate nursing students. To ensure a balanced representation, participants for the original RCT were selected using stratified random sampling, which included students from both the first and third semesters of the nursing program. The total accessible population was 200 students, with 100 in each semester.Students were included if they were enrolled in a B.Sc. Nursing program, had basic proficiency in English, and had access to a computer, tablet, or smartphone with internet access. Conversely, students with prior training in antibiotics, AMR, or AMS, those with a history of irregular class attendance, and anyone who withdrew consent or didn't participate were excluded from the study.

Data Collection

The study used a structured questionnaire to collect baseline data before randomization in original RCT. The questionnaire was divided into two sections: one for socio-demographic information and one for knowledge. The knowledge questionnaire was a 15-item multiple-choice questionnaire designed to evaluate students' understanding of antibiotics, AMR, and AMS. Participants' scores were categorized into three levels: "Adequate" for scores of 12 points or higher (≥75%), "Moderately Adequate" for scores between 8 and 11 points (51%–75%), and "Inadequate" for scores of 7 points or lower (≤50%). The questionnaire was developed through a rigorous process, including a review of existing literature and refinement based on a pilot study. The questionnaire's reliability was confirmed with a Cronbach's alpha of 0.78 and an intraclass correlation coefficient (ICC) of 0.80. The questionnaire took an average of 15 to 25 minutes to complete, and all responses were anonymized to protect participant confidentiality.

Statistical Analysis

The data was analyzed using SPSS version 20. The study used descriptive statistics to summarize knowledge scores and socio-demographic variables, followed by Chi-square tests to identify significant differences in knowledge scores and categories based on socio-demographic factors. All tests were two-tailed, with a p-value of less than 0.05 indicating statistical significance.

Results

Participant Characteristics

The average age of the participants in this study was 16.2 ± 1.1 years with 70% being female. The sample was evenly split between first and third-semester students, with most living with parents (40%). (Table 1).

Table 1: Socio-demographic Characteristics of Participants (N = 140)

Variable	Frequency (%)
Age (years)	
<17	120(85.7)
18–23	20 (14.3)
>24	0 (0)
Gender	
Female	98(70)
Male	42(30)
Semester	
First	70 (50.0)
Third	70 (50.0)
Place of Residence	
With parents	56 (40)
With relatives	9(6.4)
With friends	9(6.4)
Alone in rented room	34 (24.3)
In college hostel	32(22.9)

Knowledge Level

The study found a mean knowledge score of 7 ± 2.067 out of 15, with a correct response rate of 47.3%. None of the 140 participants achieved an "adequate" level of knowledge, with 59.3% demonstrating inadequate knowledge. However, 40.7% had a moderately adequate level of knowledge, scoring between 8 and 11 points (Figure 1). This data highlights significant knowledge gaps among students.

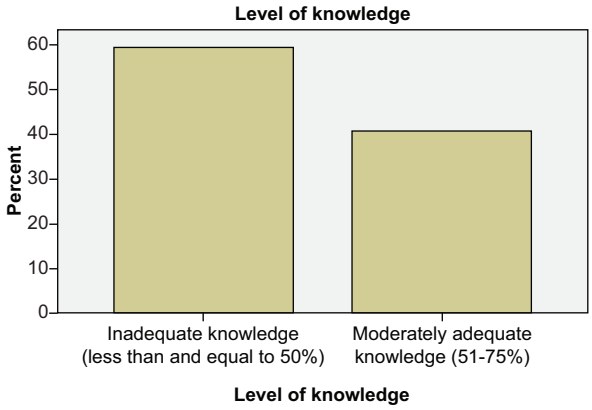

Figure 1. Distribution of Baseline Knowledge Scores (N = 140)

A study reveals that students' understanding of antimicrobial resistance (AMR) varies significantly, with an average of 46.6% of questions correctly answered. The most significant areas of misunderstanding were antibiotic side effects, factors contributing to AMR, and the spread of AMR in healthcare facilities (Table 2). These areas are critical and practical aspects of antimicrobial use and infection control.

However, students showed a relatively better understanding of topics like antimicrobial prescription guidelines, AMR prevention, and the role of healthcare professionals in AMS.

Table 2: Knowledge of participants on antibiotic use, antimicrobial resistance and stewardship

S.N	Items	Correct response n(%)	Incorrect response n(%)
	Antibiotic use		
	Condition that should be treated with antibiotics	55(39.3)	85(60.7)
	Prolonged courses of antimicrobials	70(50)	70(50)
	Common side effects of antibiotics include all the following except	19(13.6)	121(86.4)
	Antimicrobial resistance		
	Antimicrobial resistance is	72(51.4)	68(48.6)
	Gram-positive bacteria have become a threat and is considered a global pandemic in antibiotic resistance	60(42.9)	80(57.1)
	Patients with antimicrobial resistance infections	72(51.4)	68(48.6)
	Antimicrobial resistance in healthcare facilities is spread mainly by	44(31.4)	96(68.6)
	Antimicrobial resistance is promoted by	40(28.6)	100(71.4)
	Antimicrobial resistance can be prevented by	94(67.1)	46(32.9)
	Antimicrobial stewardship		
	Antimicrobial prescription guidelines	95(67.9)	45(32.1)
	Antimicrobial stewardship programmes	66(47.1)	74(52.9)
	Goals of antimicrobial stewardship include	52(37.1)	88(62.9)
	Antimicrobial stewardship programmes can save healthcare facilities money by	85(60.7)	55(39.3)
	An ideal antimicrobial stewardship team should be made up of	70(50)	70(50)
	In antimicrobial stewardship, major role of health professional is to	86(61.4)	54(38.6)

Associations with Socio-demographic Variables

The study found a significant correlation between a student's knowledge level and their semester of study, with third-semester students showing a higher level of moderately adequate knowledge compared to first-semester students. However, no significant association was found between knowledge level and other demographic factors. (Table 3).

Table 3: Associations Between Knowledge Scores and Socio-demographic Variables

Variable	Level of Knowledge		chi-square value	p-value
	Inadequate knowledge	Moderately adequate knowledge		
Age				
<17	71	49	0.005	0.944
18–23	12	8		
Gender				
Male	28	14	1.354	0.245
Female	55	43		
Semester				
First	49	21	6.658	0.010*
Third	34	36		
Place of Residence				
With parents	35	21	3.796	0.434
With relatives	3	6		
With friends	4	5		
Alone in rented room	21	13		
In college hostel	20	12		

Discussion

The global health community acknowledges the importance of antimicrobial stewardship in combating antimicrobial resistance (AMR). This study provides insights into undergraduate nursing students' baseline knowledge, aligning with global trends and highlighting specific deficiencies that require strategic educational reform. The study contributes to the conversation on nursing education and AMS.

The study found that 59.3% of participants had inadequate knowledge, indicating a significant knowledge gap. This is consistent with international studies indicating correct response rates ranging from 42% to 57.9%.[10-12,14,16-25] The lack of adequate knowledge scores suggests a flaw in the current educational framework, highlighting the critical gap in nursing education and the need for a comprehensive re-evaluation of teaching methods.

Further investigation in study found that only 39.3% of nursing students correctly identified conditions requiring antibiotic treatment, indicating difficulty distinguishing between bacterial and viral infections. This is concerning, as inappropriate

antibiotic use for viral infections is a key driver of AMR. Nurses, responsible for patient care and medication management, are at risk due to their limited understanding of antibiotic risks. Similar findings were found in Thailand and China, where students had low correct response rates on antibiotic use with figures as low as 29.7% and 30.0%, respectively. [16,26]

Furthermore, nursing students have significant knowledge gaps in key AMR concepts, with a weak understanding of antibiotic side effects (13.6% correct), causes of AMR (28.6% correct), and the spread of AMR in healthcare settings (31.4% correct). However, they have a stronger grasp of antimicrobial prescription guidelines (67.9% correct), AMR prevention strategies (67.1% correct), and the role of healthcare workers in stewardship (61.4% correct). This suggests that though students have some theoretical knowledge, they lack practical, clinical insight for safe use of antimicrobials and effective infection control. Current educational approaches may be overly focused on theory, failing to bridge the gap between classroom learning and real-world clinical application. These findings are consistent with previous research identifying similar knowledge gaps among nursing students in areas such as AMS principles, appropriate antibiotic use, microbiology, and resistance mechanisms suggesting Interventions to be tailored to local contexts.

For example, a study in Spain found low knowledge levels among nursing students about AMR despite some awareness of general antibiotic use.[11]Similarly In South Africa, final-year nursing students showed inconsistent understanding of antibiotics and AMR/AMS principles, indicating a need for curriculum improvement.[10] In the UK, nursing students showed limited understanding of the microbiological basis of AMR and their roles in stewardship.[27] Likewise, In Jordan, students had moderate knowledge (65.2%) about AMR transmission but a stronger understanding (over 76%) of effective antibiotic use and side effects.[12] In Saudi Arabia, students (67.3%) incorrectly believed that skipping doses would not contribute to resistance.[19] Another study in Thailand, students (93.1%) believed their bodies could develop immunity to antibiotics, revealing a fundamental misunderstanding of resistance mechanisms.[16]

These variations reflect the influence of different curricula and local contexts on student's knowledge. Findings from India align with those from other low- and middle-income countries, where knowledge levels vary but show considerable potential for improvement through targeted interventions.[10,16,26,28] In contrast, high-income countries generally showed greater baseline awareness of AMS concepts but still face significant knowledge deficits.[21,23,24,27] Collectively, These findings highlight a global and regional gap in nursing education, emphasizing the need for tailored educational strategies to better prepare future nurses for effective antimicrobial stewardship,

The study found a significant correlation between students' semester of study and their knowledge on AMR and AMS, with third-semester students having a moderately adequate knowledge compared to first-semester students. This suggests that academic progression and exposure to relevant coursework may improve students' understanding of these concepts. However, even third-semester students did not achieve adequate proficiency, suggesting that the current curriculum may be slow, lack coherence, or fail to address the complexity of AMR and AMS. The study also found no significant associations between knowledge levels and other socio-demographic variables, suggesting persistent knowledge deficits across student demographics and pointing to systemic issues in educational design, such as curriculum structure and teaching methodologies, rather than individual student characteristics.

Implications for nursing education

The study highlights the need for revising nursing curricula and adopting innovative teaching methods to prepare students for their roles in antimicrobial stewardship. Active learning strategies like game-based learning, problem-based learning, case studies, and high-fidelity simulations can enhance student engagement, promote critical thinking, and facilitate real-world application of knowledge. For sustained and widespread impact, policy-level advocacy is also crucial, with institutional and national policies prioritizing comprehensive AMR and AMS

education, adequate funding, faculty training, and new teaching methodologies.

Limitation and future research

The study's small sample size from a single institution limits its generalizability. Future research should focus on larger, multi-center studies involving diverse nursing colleges and regions. Additionally, the study's self-reported questionnaires may introduce response biases, potentially impacting the accuracy of knowledge assessments. To mitigate these limitations, more robust assessment methods should be employed to strengthen the evidence base.

Conclusion

The study reveals a significant gap in undergraduate nursing students' understanding of antibiotics, Antimicrobial Resistance (AMR), and Antimicrobial Resistance (AMS). No participant demonstrated adequate understanding, highlighting the need for curriculum reform and innovative pedagogical approaches. By equipping future nurses with evidence-based knowledge and practical skills, they can contribute to effective antimicrobial stewardship. Strengthening curricula in AMR and AMS will position future nurses to mitigate the global burden of AMR, enhance patient safety, and strengthen healthcare systems. The findings support the development and implementation of evidence-based curricula, positioning nursing education as a cornerstone of public health strategies to combat AMR.

Declarations

- Ethics approval

Ethical approval for the original Randomized Controlled Trial (RCT), from which this baseline data was collected, was granted by the Institutional Ethics Committee of Datta Meghe Institute of Higher Education & Research (DMIHER(DU)/IEC/2023/141C). The study was conducted in accordance with the Declaration of Helsinki 2008.

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The Effectiveness of Self-Help Group (SHG) Therapy in Preventing Drug Use Among Adolescents: A Cluster Randomized Controlled Trial

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Abstract

Objective: This study explores the effectiveness of Self-Help Group (SHG) therapy in preventing drug abuse among adolescents.

Methods: A cluster randomized controlled trial was conducted with 80 junior high school students in Aceh, Indonesia. Participants were divided into intervention and control groups. The intervention group underwent a six-week Self-Help Group(SHG) therapy program. Outcomes including knowledge, attitudes, desire to use drugs, social support, and self-efficacy were assessed via self-report questionnaires.

Results: The intervention group showed significant improvements in knowledge ($p = 0.001$), attitudes ($p = 0.001$), and a reduced desire to use drugs ($p = 0.001$). There was no significant change in social support ($p = 0.139$), but a significant decrease in self-efficacy ($p = 0.007$).

Conclusion: Self-Help Group (SHG) therapy is effective for enhancing knowledge and attitudes and reducing drug-use intentions among adolescents. Additional strategies are needed to strengthen social support and self-efficacy.

Keywords: Self-Help Group (SHG), Attitude, Knowledge, Drug Abuse, Self-Efficacy

Introduction

Drug abuse is a growing concern in Indonesia, especially among adolescents. Misuse of narcotics, psychotropics, and addictive substances can impair brain function and lead to addiction[1]. Adolescents are particularly vulnerable due to peer pressure, emotional instability, and limited awareness about the dangers of drug use [2].

Adolescents are usually under pressure to follow the norms and expectations of the group.

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If teens can't do their job well, they tend to think life is miserable and unpleasant, and they tend to do things like self-harm, abandon life and family, take part in promiscuity, consume alcohol, drugs, psychotropics, and other addictive substances[3].

Studies indicate that adolescent drug abuse is linked to decreased academic performance, mental health issues, and social problems. Effective prevention requires not only legal action but also early education and psychosocial support. Despite the government's rehabilitation programs, many adolescents lack access to effective counseling and preventive education[3].

Group therapy is a promising non-pharmacological approach to drug prevention. Among various models, Self-Help Groups (SHG) have shown effectiveness in fostering emotional support and promoting behavioral change. Self-Help Group (SHG) encourages participants to share experiences, set goals, and develop coping strategies together[4].

Self-help groups (SHG) seek to change unconscious thoughts, feelings, behaviors, and processes and acquire new skills. The process of Self-Help Group (SHG) intervention includes sharing experiences between members, setting goals, analyzing problems, setting short- and long-term goals, creating treatment plans, executing plans, and evaluation and termination[5]. Previous studies have shown its success in reducing depression and improving resilience among at-risk individuals[6].

In the context of school-based interventions, Self-Help Group (SHG) is particularly relevant due to its low cost, peer-driven structure, and adaptability to different cultural settings. Adolescents can benefit from a structured environment that promotes self-expression, empathy, and mutual support—qualities often lacking in traditional education systems. Integrating Self-Help Group (SHG) into school programs may therefore serve as an effective strategy to curb early experimentation and habitual drug use.

Given Indonesia's high rates of adolescent drug use, lack of evidence of the use of Self-Help Group (SHG) in drug abuse prevention, and limited access to preventive drug abuse education, this study aims to evaluate the effectiveness of Self-Help Group (SHG) therapy in preventing drug use among adolescents in Aceh Besar, Indonesia.

Materials and Methods

Study Design and Setting

This study employed a cluster randomized controlled trial (cRCT) with a pretest-posttest control group design. The research was conducted in two public junior high schools, located in Aceh Besar District, Aceh Province, Indonesia.The Flow of the research process is summarized in Figure 1.

Participants and Sampling

The sampling technique in this study employed a cluster random sampling method within the framework of a cluster randomized controlled trial (cRCT). The target population consisted of adolescents aged 15–18 years enrolled in junior high schools in Aceh Besar District, Indonesia. Two public junior high schools were selected as research clusters, and all eligible students within these schools were included as participants. A total of 80 students were recruited and subsequently randomized into two groups. The intervention group, comprising 40 students, participated in six sessions of Self-Help Group (SHG) therapy, while the control group, also consisting of 40 students, did not receive any intervention during the study period. This sampling approach ensured that all students within the selected clusters had an equal opportunity to participate, while randomization allowed for a fair and unbiased allocation between the intervention and control groups

Inclusion and Exclusion Criteria

The inclusion criteria for the sample in this study were adolescents aged 15–18 years who were actively enrolled as students in the selected junior high schools in Aceh Besar. Participants were required to provide informed consent, with parental or guardian approval, and be willing to attend all six sessions of the intervention. Students who met these conditions were considered eligible to participate.

The exclusion criteria included students who were absent from more than one intervention session, those

with a history of severe mental disorders or chronic illnesses that could interfere with participation, and those who did not provide consent or whose parents or guardians declined to permit their involvement in the study.

Intervention Procedure

Neither the intervention nor the control group had been exposed to Self-Help Group (SHG) therapy prior to this study. At baseline, the majority of students (78.8%) reported that they had never received any formal education or counseling related to drug prevention, indicating limited prior exposure to structured preventive programs. Thus, the SHG therapy provided in this study represented the participants' first experience with such an intervention. During the trial, the intervention group exclusively received six sessions of SHG therapy, while the control group did not receive any intervention throughout the study period. This ensured that the outcomes observed could be attributed solely to the SHG intervention.

Participants in the intervention group participated in a structured Self-Help Group (SHG) therapy program over six weekly sessions. Each session lasted approximately 120 minutes and was administered in class.

The intervention program covered educational, interactive, and reflective activities related to drug prevention. Session I and II (Week 1 and 2) provided participants with information about the concept of Drugs. Session III (Week 3) showed participants videos related to the dangers of narcotics and psychotropic substances abuse. Session IV and V (Week 4 and 5) provided role play about the dangers of narcotics and psychotropic substances. Session VI (Week 6) conducted an evaluation of the Self-Help Group (SHG) activities and materials that had been provided to participants.

There was no intervention provided to participants in the control group during the study period.

Instruments and Outcome Measures

Data collection utilized a self-report questionnaire. Demographic characteristics assessed participants' age, gender, class, ethnicity, language, living arrangements, physical activity, school attendance, academic performance, and exposure to drug education. Knowledge about drugs was assessed through 14 multiple-choice questions, while attitudes toward drug prevention were evaluated using 29 Likert-scale statements. The desire to try drugs was measured with 9 multiple-choice items designed to reflect curiosity and intention. These three questions (knowledge, attitude, and the desire to try drugs) were developed by researchers. The development of the questionnaires has been published elsewhere[7]. Perceived social support was evaluated using the 12-item Multidimensional Scale of Perceived Social Support (MSPSS)[8],and self-efficacy was assessed using the 10-item General Self-Efficacy Scale[8]. Scoring adhered to the guidelines of the respective instruments, with higher scores representing greater knowledge, more favorable attitudes, lower desire to use drugs, stronger social support, and higher self-efficacy.

Data Collection and Analysis

Pretests were administered one week before the intervention began, and posttests were conducted one week after the final session. The same schedule was followed for both groups.

Data analysis was completed using SPSS version 20. Univariate analysis was usedto calculate the frequency and percentage of the categorical variable. Inferential statistics were used to identify the mean differences between groups.

Results

Demographic Characteristics

The demographic profile of study participants is summarized in Table 1. Of the 80 respondents, 41.3% were male and 58.8% were female. The vast majority were over 12 years of age (97.5%), and the distribution between 8th and 9th grade students was equal. Most participants identified as Acehnese (96.3%), with 63.7% speaking Acehnese at home. The majority lived with their parents (91.3%), engaged in physical activity one to two times per week (70.0%), and attended school regularly (56.3%). In terms of academic self-assessment,

Table 1: Demographic Characteristics of Respondents

Characteristic	Frequency	Percentage
Sex		
Male	33	41.3
Female	47	58.8
Age (years)		
10	1	1.3
12	1	1.3
>12	78	97.5
Class		
8	40	50.0
9	40	50.0
Ethnicity		
Aceh	77	96.3
Batak	2	2.5
Others	1	1.3
Language Used at Home		
Acehese	51	63.7
Indonesia	2	2.5
Acehese and Indonesia	26	32.5
Others	1	1.3
Living arrangement		
With parents	73	91.3
With relatives	1	1.3
In dormitory/shelter	6	7.5
Physical activity		
Almost every day	12	15.0
One or two times a week	56	70.0
Several times a month	9	11.3
Several times a year	1	1.3
Never	2	2.5
School Attendance		
Always go to school	45	56.3
Absent One day	15	18.8
Absent Two days	8	10.0
Absent Three days	6	7.5
Absent more than three days	6	7.5

Characteristic	Frequency	Percentage
Academic Performance (Self-rate)		
Very smart	14	17.5
Smart	25	31.3
Average	31	38.8
Below average	1	1.3
Don't know	9	11.3
Drug Education Experience		
Once	17	21.3
Never	63	78.8

38.8% rated themselves as average students, while 78.8% reported never having received any drug education or counseling.

Effectiveness of Self-Help Group (SHG) Therapy in the Intervention Group

As shown in Table 2, Self-Help Group (SHG) therapy had a statistically significant effect on several outcomes among participants in the intervention group. Mean score of knowledge test about drug use increased significantly from a pretest score of 38.15 to a posttest score of 65.58 (p=0.001). Attitudes toward drug prevention also improved significantly from 64.85 to 110.95 (p=0.001), and the intention to try drugs decreased significantly from 53.25 to 37.03 (p=0.001). While self-efficacy scores declined from 41.90 to 37.30 (p=0.007), there was no significant change in perceived social support (p=0.14).

Table 2: Pre-and Post-Test Results in the Intervention Group

Variable	Test	Mean	SD	Min-Max	P-Value
Knowledge	*Pre test*	38.15	11.751	14-57	0.001
	Post test	65.58	8.003	43-78	
Attitude	*Pre test*	64.85	20.70	43-148	0.001
	Post tes	110.95	25.32	61-145	
Desire to Try Drugs	*Pre test*	53.25	23.901	29-122	0.001
	Post tes	37.03	5.659	26-45	

Table 3: Pre- and Post-Test Results in the Control Group

Variable	Test	Mean	SD	Min-Max	P-Value
Knowledge	*Pre test*	37.88	15.022	14-78	0.001
	Post test	50.75	13.307	28-78	
Attitude	*Pre test*	72.95	32.781	29-145	0.239
	Post tes	66.00	22.022	39-110	
Desire to Try Drugs	*Pre test*	34.40	9.397	20-45	0.003
	Post tes	40.80	6.840	27-45	

Control Group Outcomes

The results for the control group are presented in Table 2. Mean score of knowledge showed a modest but significant increase from 37.88 to 50.75 (p=0.001). However, attitudes did not significantly change (p=0.24), and the desire to try drugs increased unexpectedly from 34.40 to 40.80 (p=0.003). Perceived social support improved significantly (p=0.001), and self-efficacy remained stable (p=0.95). These findings highlight the effectiveness of Self-Help Group (SHG) therapy in improving adolescents' knowledge and attitudes toward drug use and reducing their desire to engage in drug use. However, the intervention had limited impact on self-efficacy and perceived social support, suggesting the need for supplementary strategies to reinforce these aspects.

Discussion

The results of this study demonstrate that Self-Help Group (SHG) therapy is an effective intervention for improving drug-related knowledge, fostering positive attitudes, and reducing the desire to use drugs among adolescents. These findings are consistent with previous research highlighting the benefits of peer-led group interventions in enhancing adolescent health outcomes[6].The significant increase in knowledge scores in the intervention group reflects the impact of structured educational content delivered through Self-Help Group (SHG). By engaging in interactive sessions and group discussions, adolescents not only received information but also had opportunities to process and internalize it collectively. Peer education can be a promising strategy for positive health behavior changes.

Similarly, the improved attitudes toward drug prevention observed among the intervention group suggest a shift in mindset, likely influenced by peer modeling and emotional reinforcement. In contrast, the control group showed a decline in attitude scores, indicating the potential for deterioration in perceptions when no structured support is provided. This further validates the role of Self-Help Group (SHG) in reinforcing prosocial norms and perspectives in adolescent populations. Education can improve attitudes toward drug use.

A particularly meaningful finding is the significant reduction in the intention to try drugs among the intervention group. This outcome emphasizes the impact of Self-Help Group (SHG) in reducing behavioral intentions related to drug experimentation through peer accountability, emotional reinforcement, and increased self-awareness. Meanwhile, the increase in intention to try drugs observed in the control group further underscores the importance of preventive programming in adolescent populations.

Despite these positive results, Self-Help Group (SHG) therapy did not significantly improve perceived social support and was associated with a slight decrease in self-efficacy. These findings may be explained by several factors. First, the limited six-week duration of the intervention may not have been sufficient to strengthen broader support networks beyond the group context. Second, the Self-Help Group (SHG) activities were conducted exclusively in school environments without direct engagement from family members or the community. Prior literature indicates that robust social support typically requires consistent interaction across multiple life domains.

The decrease in self-efficacy, although statistically significant, may be attributed to adolescents' increased awareness of their vulnerabilities and the challenges associated with resisting peer pressure. While knowledge empowers decision-making, it can also expose individuals to new anxieties or doubts if not accompanied by practical coping strategies. Therefore, future Self-Help Group (SHG) interventions should incorporate skill-based components to enhance self-efficacy, such as role-playing, decision-making simulations, and problem-solving exercises.

Interestingly, the control group experienced improvements in perceived social support and maintained stable self-efficacy levels. These effects may stem from unmeasured external factors, including family encouragement, teacher interactions, or informal peer discussions during the study period. This observation reflects the complex and dynamic influences surrounding adolescent behavior and highlights the importance of comprehensive approaches in drug prevention efforts.

Overall, while Self-Help Group (SHG) therapy provided measurable cognitive and attitudinal benefits, its effects on emotional resilience and perceived capability were limited. To strengthen the intervention's impact, future implementations should consider integratingSelf-Help Group (SHG) with broader psychosocial supports, including parental involvement, school counselor engagement, and community partnerships.

These findings offer meaningful contributions to school-based health promotion initiatives, especially in resource-limited settings. Self-Help Group (SHG) can serve as a practical, scalable model for engaging youth in preventive education and building a culture of mutual support and accountability.

This study has several limitations. First, the relatively short intervention period (six weeks) may not have been sufficient to observe long-term effects on social support and self-efficacy. Second, the intervention was confined to the school setting and did not involve external stakeholders such as parents or community members, which may have limited its broader impact. Third, exposure to external information or informal support outside the intervention could not be controlled, potentially influencing the control group's results. Lastly, the use of self-reported questionnaires may have introduced response biases, particularly in measuring sensitive behaviors and intentions.Future research should consider longitudinal designs with extended follow-up periods and incorporate multi-component interventions involving families and community actors to strengthen the sustainability and generalizability of the outcomes.

Conclusion

This study concludes that Self-Help Group (SHG) therapy is an effective intervention for preventing drug use among adolescents. It significantly improved participants' knowledge and attitudes toward drug prevention and reduced their desire to try drugs. However, the therapy did not show a significant effect on perceived social support and was associated with a decrease in self-efficacy. These findings suggest that while Self-Help Group (SHG) is a promising model for adolescent health promotion, it should be complemented with additional strategies aimed at enhancing emotional resilience and supportive environments. Future implementations of Self-Help Group (SHG) could benefit from longer intervention periods and greater involvement from families, schools, and communities to optimize outcomes across all domains.

List of Abbreviations

SHG: Self-Help Group

CRCT: Cluster Randomized Controlled Trial

SPSS: Statistical Package for the Social Sciences

DRTPM: Directorate of Research and Community Service

Ethics Approval: The study received ethical approval from the Research Ethics Committee of the Faculty of Nursing, Universitas Syiah Kuala, under approval number 112026120724. Informed consent was obtained from all participants and their guardians prior to data collection.

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Availability Data

Data supporting article's results is available from the corresponding author [T.T.] on reasonable request.

Authors' Contribution

SJ: Study concept, designing, data collection and manuscript drafting

TT: Study designing, critical review and revision of the initial and final draft

MN: Data analysis and interpretation, critical review and revision of the final draft

All the authors have read and approved the final manuscript.

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