

School nurses' evaluations of their competence in counseling adolescents on physical activity and the use of digital technology: a cross-sectional study

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Abstract

Most adolescents are insufficiently physically active and technology use has become a crucial part of people's lives. School nurses have a key role in health promotion. The purpose of this study was to determine the associations between school nurses' lifestyle counseling competence (specifically, their competence in counseling students on physical activity and technology use) and various potentially related factors (including the background of the nurses, the time spent on counseling during a working day, and the nurse's education on physical activity and technology use). To our best knowledge, there is no up-to-date information about school nurses' counseling concerning physical activity and technology use. A cross-sectional study design was used. Data were gathered by surveying nurses working in school or student healthcare ($n = 116$) in Finland during the autumn of 2017. The data were analyzed using descriptive statistics, non-parametric tests, and logistic regression analysis. The survey included one open-ended question which was analyzed by performing inductive content analysis. Over half (58.6%) of respondents assessed that the competence in physical activity and technology use counseling is overall good. 85.3% of the respondents evaluated their physical activity counseling skills and 62.9% technology use counseling skills to be good. Only 33% of the nurses knew how to identify adolescents needing counseling concerning technology use. Education on physical activity and recreational technology use was more relevant than age in explaining nurses' counseling knowledge and skills. School nurses reported that there is a need to develop skills and tools for counseling adolescents about the recreational use of technology. The results highlighted three factors which limited the development of counseling; a lack of resources; a need for more education; and a lack of clear, consistent policies and tools for adolescents' lifestyle counseling. There is also a need for more multi-professional cooperation and time for counseling. The results presented herein could be used in designing targeted interventions and education in school and student healthcare and with it to improve the lifestyle counseling offered by school nurses.

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Keywords: nurse, adolescent, counseling, health promotion, health education, physical activity, technology use

Introduction

Adolescents' lifestyles have a lifelong influence on health in adulthood [1]. At present, 81% of 11-17-year-olds are physically inactive [2]. Additionally, adolescents spend more time using digital devices [3]. The use of technology may have positive effects including e.g. health promotion [4, 5], but for some, the use may become problematic [6-10] which include an inability to control the use, disruptions in daily scheduling, and withdrawal [4, 6,]. Excessive technology use is also linked to healthy lifestyles, as it is associated e.g. with lower physical activity [11]. Insufficient physical activity and excessive technology use increase the risk of diseases in adolescence [2, 12, 13] and may result in the development of a habit that continues into adulthood [14, 15]. Physical activity has positive effects on e.g. cardiovascular and musculoskeletal health, body weight and cognitive development [16].

Adolescents and their parents need support and information to maintain and implement healthy lifestyles [17-19]. School nurses (defined in this study as public health nurses who work in schools or student healthcare) can provide such support through counseling [20, 21]. Lifestyle counseling should be multi-professional, evidence-based, and involve collaboration among school nurses, other professionals (e.g., teachers), and parents to enhance the quality [20, 21-25]. High-quality lifestyle counseling in school healthcare lacks a standard definition [22]. In this study, it refers to interactive, goal-oriented sessions between a nurse and an adolescent aimed at increasing physical activity and reducing excessive technology use [22]. Effective counseling should be person-centered, interactive, goal-oriented, and supported by adequate resources to promote health and well-being [22].

School nurses should be able to offer exercise recommendations when counseling about the importance of daily physical activity, but physical activity counseling rates remain quite low in many countries [26, 27]. School nurses require high levels of skill and comprehensive evidence-based knowledge to provide effective lifestyle counseling, but lack of time, resources and competence might negatively impact the effectiveness [20, 22]. The impact of evidence-based healthcare depends on school nurses' knowledge and attitudes [28]. Effective counseling requires understanding adolescents' motives and exercise habits [29] and using diverse methods like toolkits, and global guidelines [30-32] which can aid dialogue [33].

School nurses play a key role in advising adolescents on their digital technology use, despite its challenges [34, 35]. They should understand recommendations for responsible digital technology use (e.g. age limits). While a two-hour daily screen time limit was once advised, it is often exceeded and deemed impractical [36-38]. Moderate use can support emotion regulation and stress relief [39], but excessive use is linked to psychological issues, sleep disturbances, and concentration difficulties [40-43]. Conversely, physical activity can protect against the symptoms of excessive use [6]. Other risk behaviors associated with recreational technology use include e.g. problematic social media use [44, 45]. A previous study highlights that healthier technology use should address the purpose and content of technology use, adolescents' interactions and the quality of those interactions, as well as education on the topic [44] and school nurses need to prevent problems regarding excessive technology use at an early stage [46]. School nurses thus need information about the consequences of

excessive technology use, tools [47-49], as well as continuous professional development and resources [24, 44]. They can help adolescents reduce screen time by conducting lifestyle surveys and using control programs [50-53]. Parents should also be instructed to limit adolescents' screen time [54, 55]. Active involvement in their children's online activities helps reduce risky behavior [56].

School nurses play a crucial role in enhancing the health and well-being of adolescents by promoting health, offering advice, directing them to other services, providing treatment and education, supporting families and collaborating with different professionals [57] which requires a broad range of competencies. Previous studies have been done concerning school nurses' counseling competence about physical activity [e.g., 22]. To our knowledge, no prior studies have examined school nurses' counseling competence regarding technology use or its connection with physical activity. This study addresses this gap. The purpose of this study was to determine the associations between school nurses' lifestyle counseling competence (specifically, their competence in counseling students on physical activity and technology use) and various potentially related factors (background of the nurses, the time spent on counseling during a working day, and the nurse's education on physical activity and technology use). The objective was to provide information to help guide lifestyle counseling for adolescents and for planning education for school nurses in schools and student healthcare. The research questions were as follows:

1. What is the self-assessed level of lifestyle counseling (i.e., counseling on physical activity and technology use) competence among school nurses?
2. What factors are associated with school nurses' lifestyle counseling competence?

3. How can lifestyle counseling competence be developed in school and student healthcare?

Materials and methods

The study was performed using a cross-sectional survey design. The study was conducted in accordance with the checklist 'Strengthening the reporting of observational studies in epidemiology statement' (STROBE) [58] to strengthen the reliability of the study.

Participants and data collection

Data were gathered from public health nurses working in schools or student healthcare who are registered with the Finnish Public Health Association. Participants satisfying these inclusion criteria were invited to participate in the study (n = 636). The data were collected during the autumn of 2017.

The study complied with the principles of the Helsinki Declaration [59]. The permission to conduct the study was obtained from the Finnish Association of Public Health Nurses. The data was collected using an online questionnaire that was sent to participants via the Finnish Association of Public Health Nurses (with four reminder messages). The overall response rate was 18% (n = 116). The recruitment email included information about the study, reporting of results, voluntary participation, and anonymity. The respondents' identities were not revealed at any stage of the study, and the responses were treated confidentially. Completing the questionnaire was taken to indicate a willingness to participate in the study. Participants were able to discontinue their participation at any point during the study. [60]

Measurement

Data were collected using the validated Counseling Competence Instrument (CCI) [61], adapted for this study with permission from its developer. Content validity was assessed by experts in lifestyle counseling and school healthcare (n = 3) [62]. The questionnaire included 8 background questions (age, education, working experience in healthcare in months, current working unit, time spent on counseling during the working day (hours), participation in physical activity education, participation in education of technology use) and items relating to five sub-dimensions of counseling competence:

knowledge, skills, interaction, person-centeredness, and goal-oriented counseling. Participants rated overall competence in physical activity and technology use counseling on a 5-point Likert scale (from poor to excellent) and answered an open-ended question about development needs in counseling, yielding 72 responses. A 5-point Likert scale (strongly agree to strongly disagree) was used to assess the sub-dimensions of counseling competence. The structural integrity of the instrument was tested by factor analysis. The Cronbach's alpha values ranged from 0.85 to 0.94, indicating instrument's good internal consistency (Table 1) [63].

Table 1. The sum variables and their Cronbach's alpha values.

	The sum variables	Number of items	Cronbach's alpha
Competence in physical activity counselling	Knowledge of physical activity	7	0.86
	Physical activity counselling skills	7	0.87
Competence in technology use counseling	Knowledge of technology use	10	0.94
	Technology use counselling skills	11	0.94
Competence in implementing counselling	Person-centered counselling	11	0.86
	Counselling interaction	16	0.93
	Goal-oriented counselling	8	0.85

Data analysis

The data were analyzed using IBM SPSS Statistics (v. 22). Descriptive statistics were used to analyze the participants' background data. Age was classified into four categories (Table 2). Seven sum variables were identified based on a principal component analysis (PCA) with varimax rotation (Table 1). The functionality of the component model was validated by an eigenvalue > 1 and adequate of communalities (> 0.30). The items loaded on the components were at least 0.30 and the difference between loadings was at least 0.20. The sum variables were calculated by summing the score for all the items in the variable and dividing the sum by the number of items and categorized into three groups based on means and histograms: 1.00-2.49 = good, 2.50-3.49 = moderate, and 3.50-5.00 = low. Associations between background and sum variables were tested using the Mann-Whitney U and Kruskal-Wallis tests. For logistic regression analysis, the outcome (age, working experience (months), current working unit, time spent on counseling, education of physical activity) variables were transformed into dichotomous variables with a score of 0 (disagreement) corresponding to outcome variable values of 1–3.4 and a score of 1 (agreement) corresponding to outcome variable values of 3.5–5. Age, working experience and time spent on counseling were divided into two categories splitting the responses into two parts. A stepwise forward

building based on the likelihood ratio method was used. The goodness of fit (-2 LL) was tested using the Hosmer–Lemeshow test. The level of significance was set at $p < 0.05$. [64]

The open-ended question was analyzed by performing inductive content analysis without an earlier framework. The original responses were open-coded and grouped based on similarities of the content into sub-categories and named according to their content. Three categories were then formulated by grouping the sub-categories based on the content similarities [65]. The results of the analysis were reported alongside the original expression.

Results

Participants' backgrounds

Information on the participants' backgrounds is presented in Table 2. The mean age of the respondents was 48 years (SD = 11). The majority worked in school healthcare (61.2%). The average working experience in healthcare was 18 years (SD = 12). 59.5% had participated in education concerning adolescents' physical activity and 44% in education concerning technology use. 23.4 % of the respondents spent five or more hours of their working day on counseling adolescents, 20.9 % spent four hours, one-third (27.8%) spent three hours, 22.6% spent two hours, and the rest (5.2%) spent one hour on it.

Table 2. Background information on participating school nurses (n=116).

Variable	n	%	Mean (SD)
Age	116		48 (11)
23-38	25	22	
39-49	36	31	
50-59	34	29	
60-64	21	18	
Education			
Vocational education / Bachelor's degree (University of Applied Sciences)	105	90.5	
University degree / Master's degree (University of Applied Sciences)	11	9.5	
Working experience in healthcare (years)			18 (12)
Current working unit			
School health	71	61.2	
Student healthcare	33	28.4	
School health and primary healthcare	12	10.3	
Time spent on counseling during the working day (hours)			4
Participation in physical activity education			
Yes	69	59.5	
No	47	40.5	
Participation in education on the technology use			
Yes	51	44	
No	65	56	

Note. N = Participants; % = Percentages; SD = Standard deviation.

Factors associated to school nurses' competence in lifestyle counseling and self-assessed competence levels

Overall competence in physical activity and technology use counseling

The majority (58.6%) of respondents assessed that the competence in physical activity and technology use counseling is overall good in their workplace.

Additionally, 36.2% rated it as satisfactory, and 6.9% rated it as fair. No participants rated it as poor or excellent.

Knowledge of physical activity

Most respondents (92.2%) assessed their knowledge of adolescents' physical activity as good, while 7.8% assessed their competence in this area as moderate (M = 1.08; SD = 0.27) (Table 3). Most

of them (69%) believed that they had sufficient knowledge about the impact of physical activity on adolescents' coping and studying.

School nurses' age ($p = 0.002$), working experience in healthcare ($p < 0.001$), education concerning physical activity ($p < 0.001$) and technology use ($p = 0.018$) were associated with their knowledge of physical activity. Factors that explained higher levels of knowledge about physical activity among participants included young age (23-38 years) ($OR = 849$; $p = 0.007$), shorter working experience (3 months to 13 years) ($OR = 875$; $p = 0.033$), education on physical activity ($OR = 1,275$; $p \leq 0.001$), and spending large amounts of time on counseling (5-10 hours) ($OR = 1.311$; $p = 0.006$) (Table 4).

Physical activity counseling skills

Physical activity counseling skills were mainly on a good level as 85.3% evaluated their skills to be good. Instead, 14.7% claimed only moderate skills in this area ($M = 1.15$; $SD = 0.36$) (Table 3). Most of them (64%) felt able to encourage adolescents to continue their sporting activities and (61%) were confident in being able to recognize adolescents in need of counseling about physical activity. A third of the respondents (35%) felt able to counsel adolescents to find sporting hobbies. Half (54%) of school nurses felt able to motivate adolescents to be physically active every day. Most of them (82%) spent time addressing adolescents' physical activity.

Factors associated with school nurses' skills in physical activity counseling included age ($p = 0.024$), working experience in healthcare ($p = 0.001$), time spent on counseling during the working day ($p = 0.001$), and education in physical activity ($p < 0.001$) and technology use ($p = 0.036$). Physical activity counseling skills were positively affected by spending a relatively small amount of time on counseling

(1-4 hours) during a typical working day; nurses who spent less time counseling reported better skills in physical activity counseling ($OR = .749$; $p = 0.012$) (Table 4).

Knowledge of technology use

School nurses assessed their knowledge of technology use to be good (69.8%), moderate (21.6%), and low (8.9%), respectively ($M = 1.39$; $SD = 0.64$). Only 15% of respondents felt that they knew enough about factors predictive of excessive technology use and 16% were aware that recreational use of technology during adolescence is likely to continue into adulthood.

Almost half (46%) of respondents were aware of factors that reduce adolescents' excessive use of technology. In turn, only 12% of respondents claimed adequate knowledge of peer support groups for excessive technology users (e.g. those with gaming addiction). Factors associated with good knowledge of technology use were working experience ($p = 0.003$), age ($p = 0.037$), working unit ($p = 0.019$), education of physical activity ($p < 0.001$) and technology use ($p = 0.008$).

Technology use counseling skills

School nurses assessed their technology use counseling skills to be good (62.9%), moderate (30.2%) and low (6.9%) ($M = 1.44$; $SD = 0.62$). One-third (33%) knew how to identify adolescents in need of such counseling. Over half (55%) of school nurses felt able to offer counseling about recommended amounts of screen time and 36% about responsible use of technology. Almost a third (28%) felt able to counsel adolescents to find ways to reduce and manage their daily use of technology. Half (48%) were able to identify the health effects of excessive daily technology use among adolescents.

School nurses' work experience in healthcare ($p = 0.011$), time spent on counseling during the working day ($p = 0.036$), education on physical activity ($p < 0.001$) and technology use ($p = 0.018$) were associated with technology use counseling skills. Working in student healthcare increased school nurses' skills in technology use counseling for adolescents (OR = 1.100; $p = 0.003$).

Competence in implementing counseling

The majority of the respondents (84.5%) assessed their competence in person-centered counseling to be good, 14.7% considered it moderate, and 0.9% reported it to be low ($M = 1.16$; $SD = 0.39$). When performing lifestyle counseling, 38% of the participating nurses asked adolescents to identify issues that they considered to have important effects on their situation. 56% of the participants felt that they performed counseling through mutual interaction with the adolescents. Additionally, half (49%) of the respondents encouraged adolescents to take part in counseling and 36% encouraged adolescents to state what they wanted to achieve through counseling. Factors associated with person-centered counseling were the nurses' working experience in healthcare ($p = 0.025$), time spent on counseling during the working day ($p = 0.034$), education in physical activity ($p < 0.001$), and education in the use of technology ($p = 0.003$).

Additionally, 97.4% considered their competence in counseling interaction to be good. Almost all (81%) took care to establish a confidential atmosphere and create a relationship with the adolescents they counseled (79%) ($M = 1.03$; $SD = 0.16$). Age ($p = 0.034$), time spent on counseling during the working day ($p = 0.016$), education in physical activity ($p = 0.021$), and education in technology use ($p = 0.010$) were all associated with self-assessed competence in implementing counseling.

Most respondents (77.6%) evaluated goal-oriented counseling as good, 21.6% assessed it as moderate, and 0.9% reported it as low ($M = 1.23$; $SD = 0.44$). Only 22% documented their counseling evaluations in their patient's records, and 15% sought feedback about their counseling from the adolescents. Nearly half (42%) asked adolescents how they understood the content of counseling. Factors associated with goal-oriented counseling were age ($p = 0.016$), working experience in healthcare ($p < 0.001$), time spent on counseling during the working day ($p = 0.001$) and education in physical activity ($p = 0.021$). Factors that explained goal-oriented counseling were shorter working experience (OR = .865; $p = 0.006$), working in school healthcare (OR = .860; $p = 0.024$), and spending relatively little time counseling (1-4 hours) (OR = .838; $p = 0.032$) (Table 4).

Table 3. Descriptive statistics (percentages, means, and standard deviations) of sum variables concerning school nurses' counseling competencies (n = 116).

	The sum variables	n	Good %	Moderate %	Low %	Mean ¹ (SD)
Competence in physical activity counseling	Knowledge of physical activity	116	92.2	7.8		1.08 (0.27)
	Physical activity counseling skills	116	85.3	14.7		1.15 (0.36)
Competence in technology use counseling	Knowledge of technology use	116	69.8	21.6	8.6	1.39 (0.64)
	Technology use counseling skills	116	62.9	30.2	6.9	1.44 (0.62)
Competence in implementing counseling	Person-centered counseling	116	84.5	14.7	0.9	1.16 (0.39)
	Counseling interaction	116	97.4	2.6		1.03 (0.16)
	Goal-oriented counseling	116	77.6	21.6	0.9	1.23 (0.44)

Note. ¹ Scored on a scale of 1-5, where 1 = totally agree and 5 = totally disagree / I do not need counseling; N=Participants; % = Percentages; SD = Standard deviation.

Table 4. Logistic regression models: odd ratios (OR) and confidence intervals (95% CI) for relationships between counseling competence and school nurses' background variables (n=116).

Background variable (independent variable)	Knowledge of physical activity			Physical activity counseling skills			Technology use counseling skills			Goal-oriented counseling		
	OR	CI 95%	p	OR	CI 95%	p	OR	CI 95%	p	OR	CI 95%	p
Age												
23-38	.849	.753-.956	.007									
39-64												
Working experience in healthcare (months, years)	.875											
3 months-13 years		.773-.989	.033							.865	.779-.960	.006
14 years-47,6 years												
Current working unit												
School health										.860	.755-.981	.024
Student healthcare							1.100	1.034-1.170	.003			
Time spent on counseling (hours)												
1-4				.749	.598-.938	.012				.838	.714-.985	.032
5-10	1.311	1.082-1.588	.006									
Education of physical activity												
Yes	1.275	1.129-1.440	.000									
No												

Development needs for lifestyle counseling competence in school and student healthcare. According to the content analysis, three factors limiting the development of counseling were identified: a lack of resources; a need for more education; and a lack of clear, consistent policies and tools for adolescents' lifestyle counseling.

In the first factor, school nurses felt that they lacked resources and had too many students to care for, limiting the time available for lifestyle counseling. They felt that all the available time could easily be spent providing counseling on physical activity and the use of technology and documenting their counseling work was very time-consuming. School nurses desired more extensive collaboration with teachers, media educators, sports clubs, physiotherapists, and other experts. As one respondent put it, "The school is likely to have access to more guidance and activity from media educators and sports people, as well as athletes who can help inspire and attract young people to sporting activities." In the second factor, school nurses felt that they would benefit from more education, especially about technology use. One respondent expressed this as follows: "Training on the use of technology, especially entertainment technology, is often insufficient because technology is constantly evolving." They also desired education on how to motivate adolescents to engage in physical activity and how to identify adolescents' counseling needs. Finally, they wanted education on how to counsel adolescents who already exercise a lot and do competitive sports to help them avoid potential overloads and ensure that they eat appropriately and obtain adequate nutrition.

In the third factor, school nurses expressed a need for clear, consistent policies and tools to support adolescents' lifestyle counseling. This need is reflected in responses such as: "At the moment, the

counseling is not very structured, but each nurse counsels in their own way and partly emphasizes their own interests when counseling. There is no common material on these topics either." Additionally, there was a desire for a more structured way of documenting counseling that could include an evaluation of the counseling work itself.

Discussion

The physical activity counseling skills of the nurses were rated as quite good, and they felt confident in their knowledge in this area. However, they believed their counseling on recreational technology use could be improved, with few being aware of factors predicting excessive technology use. Education on physical activity and recreational technology use was more relevant than age in explaining nurses' counseling knowledge and skills. The nurses expressed a desire for concrete tools on physical activity to enhance their counseling quality. Additionally, they shared concerns about a lack of resources to support counseling, in line with previous research [66].

According to earlier studies, school nurses find it challenging to provide appropriate counseling on healthy technology use for adolescents and their families [34]. School nurses can positively impact students at high risk of negative effects from technology use [13], but they need tools and information to identify these individuals. Early identification can also offer economic benefits, as school-based interventions are cost-effective and easily accessible [19]. Future studies should focus on developing tools for the early detection of excessive technology use.

The results indicate that nurses desire closer cooperation with families. Previous publications have highlighted the importance of school nurses being able to hear parents and develop effective

reduction plans in cooperation with the parents [13, 19]. Communication between parents and school nurses can also help reveal home-related problems and raise parents' awareness [13, 21].

In the study, nurses felt that there was insufficient collaboration with their schools. School nurses can collaborate with teachers to create a health-promoting school culture [66]. Co-operation between teachers and school nurses should be linked to the promotion of the student's overall well-being and should recognize problems associated with schooling [21]. Nurses can also cooperate with other partners including e.g. physiotherapists, which improves the quality of counseling [22].

School nurses in student healthcare reported higher confidence in guiding adolescents' recreational technology use than those in school healthcare, likely due to greater exposure to older students' technology habits. Parents of younger students also find it easier to manage their children's technology use, reducing the need for school nurse counseling [12]. Interestingly, older and more experienced nurses reported lower confidence in counseling about physical activity and technology use, possibly due to more critical self-assessment or less familiarity with current technology trends. Younger nurses may be more knowledgeable about technology risks, enhancing their counseling skills. Continuous education is essential to support all nurses in effectively promoting healthy lifestyles [22].

School nurses felt that improving counseling requires more resources, education, cooperation, methods, and instruments. Not all schools have full-time nurses, affecting resources and collaboration [12]. This study found that inconsistent counseling recording practices affected resource availability. Nurses expressed a need for a more structured approach to recording counseling sessions and

evaluations. While public health nurses are responsible for evaluating health plans and their impact [67], few nurses record their counseling assessments in patient documents.

Strengths and limitations

The present study has several limitations. The survey's response rate was low, which weakens the generalizability of the results. Additionally, the respondents' competencies were evaluated using a self-reporting survey, which creates a high risk of bias. It is also noteworthy that the data were collected in 2017 which may affect the results. On the other hand, adolescents' physical activity levels are still insufficient level and technology changes rapidly which requires continuous competence development from school nurses. The Instruments which were used in this study were validated and Cronbach's alpha scores were at a good level in this study.

Conclusions

The study provides new information about school nurses counseling competence concerning counseling physical activity and technology use. School nurses have good levels of competence and knowledge concerning counseling adolescents about physical activity and have received education in this area. However, their knowledge and skills in counseling adolescents about the use of technology should be developed through further education. In addition, nurses should be offered tools and more education on the use of goal-oriented counseling strategies. The results presented herein could be used in designing targeted interventions and education in school and student healthcare and with it to improve the lifestyle counseling offered by school nurses.

Conflict of interest statement

The authors report no conflicts of interest in this work.

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