


# BMJ Open Parent, teacher, and nurse concerns and school doctor actions: an observational study of general health checks

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## ABSTRACT

**Objective** To evaluate the association between the concerns of parents, teachers, and nurses regarding each child's well-being and the school doctor actions conducted in routine general health checks.

**Design** A blinded, observational study. Prior to the health check parents, teachers, and nurses completed questionnaires assessing their concerns. Doctors, blinded to the responses, routinely examined all children accompanied by parents and reported their actions after each health check. Multilevel logistic regression was used to analyse the association of the concerns with the actions.

**Setting** 21 primary schools in four municipalities in Finland.

**Participants** Between August 2017 and August 2018, we randomly recruited 1341 children from grades 1 and 5, aged 7 and 11 years, respectively.

**Outcome measures** Outcome measures were the respondents' concerns and the school doctor actions. The extent of concerns was assessed on a five-point Likert scale. Concern refers to 'Quite a lot or a great deal of concern' by at least one respondent. The school doctor actions included instructions and/or significant discussions, prescriptions, laboratory tests and/or medical imaging, scheduling of follow-up appointments, referrals to other professionals, and referrals to specialised care.

**Results** Altogether, respondents were concerned about 47.5% of children. The top three concerns comprised growth/and or physical symptoms (22.7%), emotions (16.2%), and concentration (15.1%). All concerns were associated with some type of school doctor action (ORs: 1.66–4.27,  $p \leq 0.05$ ); but only concerns regarding growth and/or physical symptoms were associated with all actions. Almost all concerns were associated with referrals to other professionals (ORs: 1.80–4.52,  $p \leq 0.01$ ); emotions had the strongest association OR 4.52 (95% CI 3.00 to 6.80,  $p < 0.0001$ ).

**Conclusions** Health checks by school doctors may lead to referrals of children to other professionals especially for children's psychosocial problems. This should be considered when developing the roles, training, and multiprofessional collaboration of school health care professionals.

**Trial registration** NCT03178331.

## INTRODUCTION

The collaboration of school doctors and nurses with professionals working in the educational sector provides an excellent

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The study used data gathered in a real-life setting of routine health checks, with a high participation rate, and included schools and professionals from different municipalities and socioeconomic areas.
- ⇒ Participating professionals were trained for the study process.
- ⇒ Doctors were blinded to questionnaire responses.
- ⇒ Finnish school health legislation inhibited a randomised trial.
- ⇒ We had no means to investigate the long-term outcomes of the school doctor actions.

opportunity to improve both health and education outcomes.<sup>1</sup> The organisation and resources of school health services vary globally across over 100 countries.<sup>2–4</sup> A demand remains for evaluation of routinely delivered school health services.<sup>5–6</sup> The WHO guideline on school health services recommends the identification of child health needs and the set of interventions to be employed.<sup>7</sup> Globally, an increasing demand to integrate child mental health services into primary care settings exists.<sup>7–8</sup> This could ideally decrease the burden of specialised care, ensure timely support, and increase continuity of care.

One issue still requiring solid evidence is whether school doctor services ought to be offered as universal health checks or as targeted interventions in response to the needs of a child. In a German study, selection criteria such as low social status, missing the last paediatric routine check-up, migration background, and being raised by a single parent could differentiate children for whom school entry examination should include a health check by a physician from those with no need for one.<sup>9</sup> These criteria may be ethically more difficult to accept than criteria based on concerns regarding each child. Our previous research suggested that at least one in four children have no need for a health check by school doctor according

to questionnaires that assess the concerns of parents, teachers, and nurses regarding each child's physical, mental, and social health.<sup>10</sup>

One quarter of children may need special interventions due to physical, mental, and social disorders.<sup>11</sup> In the preventive child healthcare of Netherlands, physicians and nurses identified psychosocial problems in one quarter of school-aged children and undertook actions such as advice or reassurance, consultation, referral to another professional, and/or follow-up for most of them.<sup>12</sup> Parental concerns about children's development may approach standards for screening tests and be utilised for referral decisions.<sup>13</sup> In our previous study, however, Finnish school doctors undertook actions in four-fifths of the health checks.<sup>14</sup>

In Finland, the preventive health care system is extensive, free of charge, and legally regulated starting from pregnancy throughout school age.<sup>15 16</sup> School health services are mandated to offer routine health checks by school nurses annually and also routine general health checks by school doctors during school years 1, 5, and 8 (at ages 7, 11, and 14 years) regardless of previously identified health risks. School nurses are trained in preventive care. School doctors are medical doctors with or without specialist degree; some solely work with children, some also work as general practitioners at health centres. The aims of the health checks are to strengthen the well-being and health of the family, recognise special needs, ensure timely support, and reduce health inequalities. Which actions school doctors undertake in the presence of different types of concerns of parents and professionals remain insufficiently studied. The objective of this study

was to assess the relationships between the concerns of parents, teachers, and nurses and the actions that school doctors undertake in routine general health checks.

## METHODS

The data for this observational study were collected in 2017–2018 in four cities/municipalities (Helsinki, Tampere, Kerava, and Kirkkonummi) in Finland.<sup>17</sup>

### Participants

Altogether 14 doctors participated in the study. In Helsinki, six school doctors consented to participate and selected schools from different socioeconomic areas in the city. In Tampere, Kirkkonummi, and Kerava, medical directors engaged in total eight doctors with varying education and work experience and schools from different socioeconomic areas. The 105 teachers and 31 school nurses were enrolled from the respective schools.

Between August 2017 and August 2018, we engaged a random sample of 1341 eligible children from the 21 participating schools. Children mainly studying in special education groups and whose parents needed an interpreter were excluded. The final study cohort included 1013 children (participation rate 75.5%). This comprised 506 first graders (age 7–8 years) and 507 fifth graders (age 11–12 years). Reasons for non-participation, the numbers of missing or late questionnaires and electronic reports by doctors have been reported previously.<sup>10</sup> Three cases with missing data from the doctor were excluded from the study.

**Table 1** Parent, teacher, and nurse study questionnaire responses

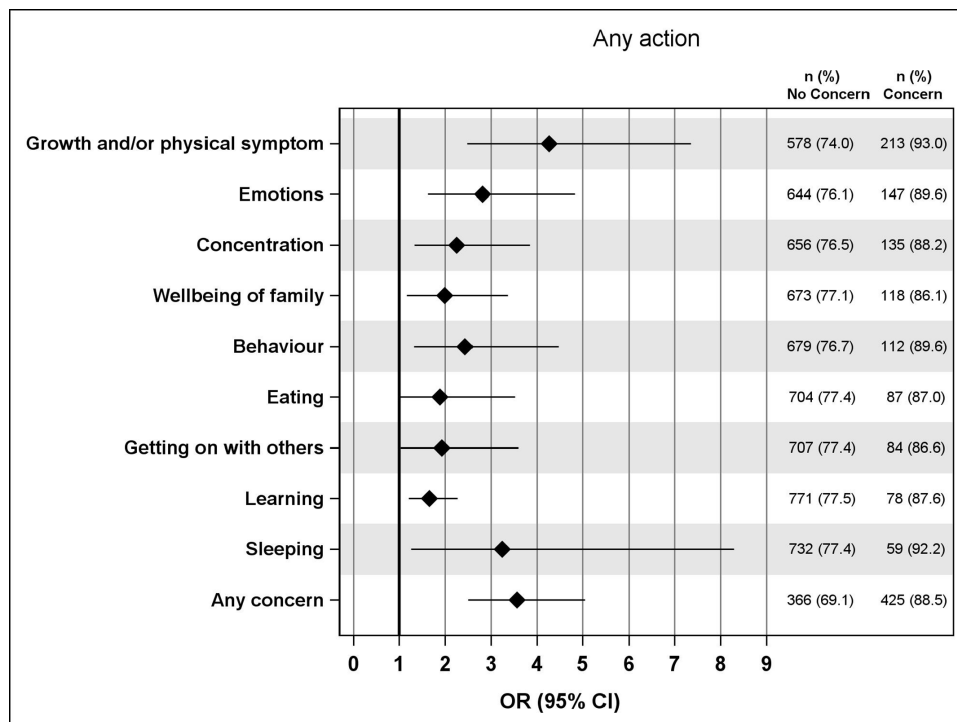
	Parent	Teacher	Nurse	Parent, teacher, or nurse
	Total	Total	Total	Total
Areas of concern*, n (%)				
Any concern	318 (32.0)	165 (20.3)	238 (24.6)	480 (47.5)
Growth and/or some physical symptom†	121 (12.4)	28 (3.4)	130 (13.5)	229 (22.7)
Emotions	94 (9.6)	56 (6.9)	61 (6.3)	164 (16.2)
Concentration	92 (9.3)	90 (11.1)	33 (3.4)	153 (15.1)
Well-being of a family member or the whole family	93 (9.5)	27 (3.3)	50 (5.2)	137 (13.6)
Behaviour	76 (7.7)	57 (7.0)	40 (4.2)	125 (12.4)
Eating	72 (7.3)	na	44 (4.6)	100 (9.9)
Getting on with others	41 (4.2)	44 (5.4)	33 (3.4)	97 (9.6)
Learning	48 (4.9)	55 (6.8)	na	89 (8.8)
Sleeping	39 (3.9)	7 (0.9)	23 (2.4)	64 (6.3)
School absenteeism	8 (0.8)	15 (1.8)	na	21 (2.1)
Hearing	na	na	12 (1.2)	12 (1.2)

Numbers are n (%) of children in the study population. Numbers in rows and columns do not add up because respondents sometimes reported concerns regarding the same children and respondents could report concerns about several different areas.

\*Concern=a great deal or quite a lot of concern by at least one respondent.

†Specified in parent's questionnaire: recurrent pain, prolonged complaints, skin symptoms, undescended testes.

Na, Not applicable.



**Figure 1** The association of combined concerns of parents, teachers, and nurses with any school doctor action; multilevel logistic regression analysis. Numbers are n (%) of actions in concern groups. Concern = a great deal or quite a lot of concern by at least one respondent (parent, teacher, or nurse); no concern = less than quite a lot of concern by all respondents (parent, teacher, and nurse); ORs adjusted for grade.

## Procedures

In brief, nurses performed their part of the health check as usual.<sup>17</sup> Before the health checks by school doctors, parents, teachers, and nurses completed study questionnaires. These questionnaires assessed the concerns of the parents, teachers, and nurses regarding each child's physical, mental, and social health based on the Strengths and Difficulties Questionnaire,<sup>18–21</sup> previous evidence,<sup>22–27</sup> and the clinical knowledge of the research group.

All school doctors performed the children's health checks as usual, typically in 30 minutes, blinded to the questionnaire responses. The doctors had access to routine background information and patient records from the health centre, specialist care, and previous school nurse health check. After each health check, the doctors had allocated time to fill in an electronic study record including details on all actions that they performed during the health check.

## Outcomes

The outcome measures were the concerns of parents, teachers, and nurses and the school doctor actions. The concerns included growth and/or physical symptoms, emotions, concentration, well-being of the family, behaviour, eating, getting on with others, learning, sleeping, school absenteeism, and hearing. The respondents assessed the extent of their concerns on a five-point Likert scale ('Not at all', 'Only a little', 'Quite a lot', 'A great deal' and 'I don't know'). We combined the

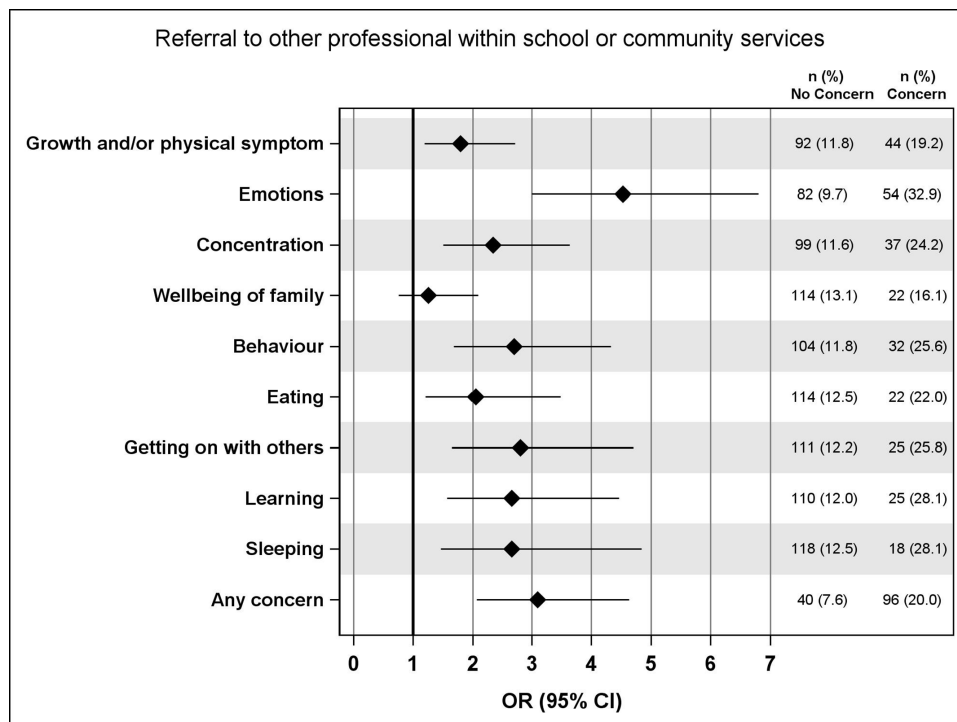
responses 'Quite a lot' and 'A great deal' and refer to them as concern.

The doctors conducted actions in 78% of the 1013 health checks.<sup>14</sup> The actions included instructions and/or significant discussions (60%), follow-up appointments (17%), referrals to other professionals within schools or community services (13%), prescriptions (10%), laboratory tests and/or medical imaging (9%), and referrals to specialised care (5%).

## Statistical analyses

According to power calculations, the number of participants was adequate for this study.<sup>17</sup> We used frequencies with percentages as descriptive statistics.

The association of the concerns of parents, teachers, and nurses with the school doctor actions were analysed using multilevel logistic regression to account for the clustered nature of the data. Four-level models with child at level one, school at level two, doctor at level three, and city/municipality at level four were utilised and models were adjusted for grade level. Concerns of parents, teachers, and nurses were child-level factors. Multilevel models included the random intercepts for schools, doctors, and cities/municipalities to account the between-cluster variation (random intercept variance) at each level. ORs with 95% CIs were calculated to quantify the association between concerns and school doctor actions. Concerns regarding school absenteeism (n=21) and hearing (n=12) were excluded from the multilevel logistic regression



**Figure 2** The association of combined concerns of parents, teachers, and nurses with referral to other professional within school or community services; multilevel logistic regression analysis. Numbers are n (%) of referrals to other professionals in concern groups. Concern = a great deal or quite a lot of concern by at least one respondent (parent, teacher, or nurse); no concern = less than quite a lot of concern by all respondents (parent, teacher, and nurse); ORs adjusted for grade.

analyses because of small frequencies. SAS V.9.4 System for Windows (SAS Institute Inc, Cary, North Carolina, USA) was applied for multilevel modelling. Other analyses were executed using IBM SPSS Statistics V.27.0 for Windows (IBM Corp, Armonk, New York, USA). P values <0.05 were considered statistically significant.

### Patient and public involvement

No patients or public were involved in this study.

## RESULTS

Respondents were concerned about 47.5% of all children. The concerns of parents, teachers, and nurses are presented in table 1. Parents were concerned about almost one-third, teachers about one-fifth, and nurses about one-fourth of all children. Parents were most concerned about growth and/or physical symptoms (12.4%) as were nurses (13.5%). Teachers were most concerned about concentration (11.1%). When concerns of different respondents were combined, the top three concerns were growth and/or physical symptoms (22.7%), emotions (16.2%), and concentration (15.1%). The concerns were similar between children in grades 1 and 5.

All concerns were associated with at least one type of school doctor action (ORs: 1.66–4.27,  $p \leq 0.05$ ) (figure 1) but only concerns regarding growth and/or physical symptoms were associated with all actions (figures 1 and 2, online supplemental table 1). All concerns, except wellbeing of family, were associated with referrals to other

professionals within schools or community services (ORs: 1.80–4.52,  $p < 0.01$ ) (figure 2); emotions had the strongest association (OR: 4.52, 95% CI: 3.00 to 6.80,  $p < 0.0001$ ). Concerns regarding growth and/or physical symptoms, emotions, behaviour, getting on with others and learning were associated with referrals to specialised care (ORs: 2.29–2.62,  $p \leq 0.01$ ) (online supplemental table 1). Concerns regarding growth and/or physical symptoms and eating were associated with follow-up appointment in school health service (ORs: 1.94–2.89,  $p < 0.001$ ) (online supplemental table 1).

## DISCUSSION

The top three concerns of parents, teachers, and school nurses regarding children in grades 1 and 5 were growth/and or physical symptoms (22.7%), emotions (16.2%), and concentration (15.1%). Altogether, parents, teachers, and nurses were concerned about almost half of the children. Parents were concerned about almost one-third, teachers about one-fifth, and nurses about one-fourth of all children. All concerns were associated with at least one school doctor action. Concerns regarding growth and/or physical symptoms were associated with all actions. Almost all concerns were associated with referrals to other professionals within schools or community services; emotions had the strongest association.

Combined, parents, teachers, and nurses had concerns regarding half of the children although children mainly



studying in special education groups and children whose parents needed an interpreter were excluded from the study cohort. These results are in line with the results from a Dutch study in the setting of preventive child healthcare, where over 40% of parents reported some concerns regarding their 7–12-year-old children, most commonly parenting in general, behavioural problems and emotional problems.<sup>28</sup> Among parents who brought their child to a paediatrician in the St Louis metropolitan area, USA, the most frequently selected health concerns parents reported for children aged 6–11 years consisted of food/activity, mental health, and allergies.<sup>29</sup>

Parents, teachers and nurses were partly concerned about different children. This is logical because the situations where parents, teachers, and nurses observe children vary greatly. Studies from the Netherlands have reported both parental concerns unconfirmed by health professionals and child health professionals more often perceiving problems in school-aged children compared with the parents.<sup>28 30</sup> In Great Britain, if a parent-reported concerns about their child's mental health, the predictive power of these concerns was significantly increased by asking whether the teacher shares these concerns.<sup>31</sup> These findings highlight the benefits of a multi-informant approach and the relevance of school doctors prioritising the children who many adults are concerned about.

All concerns in this study were associated with at least one type of school doctor action. Concerns regarding growth and/or physical symptoms were associated with all actions which is not surprising since this group comprises a large variety of symptoms which may require several actions. Assessments of growth and/or physical symptoms are also core components of medical training.

Almost all concerns were associated with referrals to other professionals within schools or community services; emotions had the strongest association. In addition, several psychosocial concerns including concerns regarding emotions, behaviour, getting on with others, and learning were associated with referrals to specialised care. School doctors may lack both the time and training to manage psychosocial problems during childhood. Primary care practitioners often experience time restrictions to manage childhood mental health problems but desire collaboration with other professionals.<sup>32</sup> In the Netherlands, physicians and nurses working in preventive child healthcare react to most psychosocial problems by providing advice to parents or through consultations with schools or their own colleagues.<sup>12</sup> Parents value immediate help from the school doctor compared with referrals to other professionals.<sup>14</sup> Unnecessary steps before providing treatment for concerns (failure demand) should be avoided and flexibility of appointment times ensured when developing the roles, training, and multi-professional collaboration of nurses and doctors in school health care.<sup>33 34</sup> The future visions of mental health services in the school environment include a multiprofessional team providing help on physical and psychosocial health questions.<sup>35</sup> Recently, telehealth has become

another promising possibility to integrate mental health services into school health services.<sup>36 37</sup>

Our study has several strengths. The study used data gathered in real life, in the setting of routine health checks, with a high response rate. The study represents the situation of children in high-income countries. We trained the participating doctors, teachers, and nurses prior to the study and blinded the doctors to the study questionnaire responses which reduced information bias. We included schools and professionals from different municipalities and socioeconomic areas, which increases the generalisability of the results. The questionnaires were developed simple to understand and fast to complete.<sup>17</sup>

The main limitation of the study is that a randomised controlled trial was inconceivable because of the legal definition of school health care in Finland. A quarter of invited families refused to participate which may have caused selection bias. Among non-participants, both concerns and actions may have been more frequent. We failed to receive one-fifth of the teacher questionnaires, whereas questionnaires from parents and nurses were seldom missing. However, the use of a multi-informant approach diluted the effect of missing questionnaires. Children mainly studying in special education groups and children whose parents needed an interpreter were consciously excluded. Children studying in special education groups may already have a rehabilitative contact in community services or specialist care. The use of an interpreter may affect parent willingness to report concerns. In both of these vulnerable groups, school doctor should be involved in coordination of care and confirming adequate services. Information bias may have occurred when doctors reported their actions. Although the doctors received similar training, subjectivity was impossible to eliminate. We accounted for this in the statistical analyses by using multilevel logistic regression and included different doctors as one of the four covariates. Since we conducted a large number of statistical analyses individual results are subject to bias. Therefore, we decided to focus the discussion on the topics that showed significant results in several areas. Since the school doctors were unaware of the questions and answers of the study questionnaires, we were unable to know whether the actions that school doctors undertook were direct responses to the concerns that respondents had. However, the questions of the study questionnaires extensively included the areas that are generally considered in preventive healthcare health checks. In addition, school doctors had access to routine background information and patient records including the previous school nurse health check. In practice, the questionnaires could be utilised prior to the health check to target school doctor actions to the respondent concerns even more specifically than in this study.

## Conclusion

Parent, teacher, and nurse concerns are important predictors of school doctor actions in routine general health

checks of primary school children. Especially psychosocial concerns were associated with referrals to other professionals. Health checks by school doctors may not be a timely way to alleviate psychosocial concerns. This should be considered when developing the roles, training, and multiprofessional collaboration of professionals working in school health services.

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**Contributors** KN conceived and designed the study, collected, analysed, and interpreted the data, and drafted the manuscript. SK made significant contributions to the design of the multicentre study and analysis plans. TV was responsible for and mainly conducted the statistical analyses. MK made significant contributions to the design of the multicentre study and analysis plans. EH participated in the design and analyses of the pilot study and the design of the multicentre study. All authors interpreted the results and critically reviewed the manuscript. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work. The guarantor SK accepts full responsibility for the conduct of the study, had access to the data and controlled the decision to publish.

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**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination plans of this research.

**Patient consent for publication** Not applicable.

**Ethics approval** This study was approved by the Coordinating Ethics Committee of the Hospital District of Helsinki and Uusimaa (HUS/2174/2017). Participants gave informed consent to participate in the study before taking part.

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**Data availability statement** Data are available upon reasonable request. The datasets generated and analysed during the current study are not publicly available due to restrictions that applied under the licence for the study but are available from the corresponding authors KN and MK on reasonable request.

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