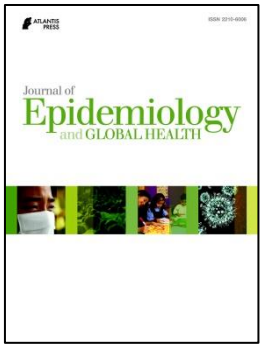

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Assessing the overuse of antibiotics in children with URTIs in Saudi Arabia: Development of the parental perception on antibiotics scale (PAPA scale)

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Australia

Abstract Background: Antibiotic overuse is influenced by several factors that can only be measured using a valid and reliable psychosocial measurement instrument. This study aims to establish translation and early stage validation of an instrument recently developed by this research team to measure factors influencing the overuse of antibiotics in children with upper respiratory tract infections in Saudi Arabia.

Method: The content evaluation panel was composed of area experts approached using the Delphi Technique. Experts were provided with the questionnaires iteratively, on a three-round basis until consensus on the relevance of items was reached independently. Translation was achieved by adapting Brislin's model of translation.

Results: After going through the iterative process with the experts, consensus was reached to 58 items (including demographics). Experts also pointed out some issues related to ambiguity and redundancy in some items. A final Arabic version was produced from the translation process.

Conclusion: This study produced preliminary validation of the developed instrument from the experts' contributions. Then, the instrument was translated from English to Arabic. The instrument will undergo further validation steps in the future, such as construct validity.

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1. Introduction

1.1. Antibiotics and upper respiratory tract infections

Despite the effectiveness of antibiotics to treat bacterial infections, they are often inappropriately used to treat viral infections. This overuse is currently one of the major public health issues worldwide [1—4]. Several problems are associated with the overuse of antibiotics; for instance, development of antibacterial resistance, increasing the burden of chronic diseases, rising costs of health services, and the development of side effects (e.g. adverse gastrointestinal effects). Antibiotic overuse was found to be significantly frequent in children, especially when presenting with viral upper respiratory tract infection (URTI) [5].

Several researchers have studied this increasing consumption of antibiotics through the years and an increasing trend of inappropriate consumption has been demonstrated in Saudi Arabia and many other countries [6—12]. Moreover, Al-Shimemeri et al. [13] found that antibiotics were the drugs most commonly prescribed by the primary care physicians for all age groups, representing 40—63% of the total drug prescriptions in the Asir region, in southern Saudi Arabia. Similarly, Ahmed and Al-Saadi [6] studied the prescribing patterns of 200 doctors in Saudi Arabia and found that among the most frequent drug categories prescribed for all age groups were antibiotics. Thus, information from these resources emphasizes the need for continuing medical education on the physicians' rational prescribing behavior.

This overuse of antibiotics is influenced by several factors. Numerous studies attempted to discover these factors; some assessed attitudes, beliefs, and knowledge of antibiotic use [14—20], others assessed behaviors (e.g. over-the-counter medication and self-medication) [2,16,20—26], and some studies measured the patients' perceptions regarding patient—doctor interaction, patient satisfaction, and patients' experience with antibiotics [18,28,29]. These studies provide a framework for the present study.

Self-medication is an important issue in Saudi Arabia [22] and several adjacent countries, including Kuwait [24], Jordan [26,30] and Sudan [20]. Factors influencing this behavior in Saudi Arabia need to be measured in order to minimize the overuse of antibiotics in children with URTIs. Information regarding the antibiotic consumption in Saudi Arabia is very limited, and there are no reports on the trends in antibiotic use among Saudi children, especially those with URTIs [31]. Thus, it is important to measure this phenomenon in Saudi Arabia.

1.2. Validity

In order to measure the psychosocial constructs influencing the overuse of antibiotics, a valid and reliable instrument needs to be available. Kimberlin and Winterstein [32] studied the issues related to the validity and reliability of measurement instruments used in research; they believe that the psychosocial phenomenon, such as antibiotics overuse, could only be measured using psychosocial measurement instruments. Furthermore, an extensive literature review has shown that there is no validated instrument that measures the factors influencing antibiotics overuse in children with URTIs [33].

Marshall et al. [34] demonstrated the significance of validity and reliability in measurement instruments in a study conducted to examine schizophrenia; they found that non-validated scales resulted in a type-one error where participants were 40% more likely to report that the treatment was effective when non-validated scales are used compared with validated ones.

1.3. Early stage validation

Validation is a multi-step process; the preliminary validation steps are content validity and face validity.

Content validity addresses the development of items included in the instrument, and measures how well these items adequately represent the construct being measured. Carmines and Zeller [35] defined ''content validity'' as ''the extent to which a measurement reflects the specific intended domain of content.'' However, there is no statistical test to determine whether a particular measure adequately covers a content area or adequately represents a construct. Content validity usually depends on the judgment of experts' knowledge with respect to the subject matter [36,37].

Beaulieu et al. [38] recommended checking the content validity of an instrument in three domains: (1) the completeness of items included in the developed instrument, i.e., to provide evidence that all key elements related to the study objectives are included in the instrument; (2) comprehensiveness of items included in the instrument in relation to the indicators being tested; and (3) the items are clearly stated and are unambiguous. This study will attempt to validate the instrument's content in the above domains.

Face validity focuses on subjective assessment [39], such as, checking grammar, syntax, organization, appropriateness, and confirmation that it appears to flow logically. It is used to check if the test appears valid to personnel who administer it, to examinees who take it, and to other untrained observers [40]. This study focuses on the point of view of the personnel who administer it.

1.4. Instrument's translation

Translating the developed survey instrument's data is necessary since it is in English and the target population where the instrument data would be administered is for the benefit of Saudi parents (i.e. Arabic language). Therefore, cross-cultural translation is important for administering the instrument to the target population. This translation process is a difficult task, and the instrument needs to be culturally acceptable and aptly translated to be valid [41,42]. This study shows the translation process of the newly developed instrument by adopting Brislin's [43] model of translation.

2. Method

2.1. Content and face validity

To assess the content and face validity of the survey instrument being developed, this study used a content evaluation panel to build the group brainstorming process [36]. The panel was composed of experts knowledgeable in the areas of pediatrics, infectious diseases, epidemiology, family medicine, psychology and counseling, and social sciences. After obtaining an ethical approval from the University of Dammam, Saudi Arabia, and Queensland University of Technology, Australia, Panelists were approached via email. Each panel member was independent, and anonymity of panel members was ensured. All the panelists were supplied with a document including background information and a cover letter explaining the study; expert's response to the questionnaire was considered their consent for participation. Twenty experts were approached and agreed to participate in the study: 11 experts were from Saudi Arabia and 9 from Australia (Table 1). Half of the panelists (10) were males and half were females.

The study was conducted using the Delphi Technique [27], which is an iterative process seeking consensus from a group of panel members or content experts through multiple rounds of questionnaires. The Delphi Technique was used instead of focus groups because of: (1) the inability of group members used in the study to meet in person; and (2) the individuals involved are less likely to be influenced by other group members than if they were meeting in person.

Table 1 Nationality and Specialty of Experts.

Specialty	Nationality		Total
	Saudi	Australian	
Family medicine	2	0	2
Pediatrics	3	0	3
Epidemiology	4	1	5
Pediatric infectious diseases	1	0	1
Psychology	0	6	6
Social sciences	0	1	1
Emergency	0	1	1
Quality specialist	1	0	1
Total	11	9	20

The Delphi process consisted of three rounds (Fig. 1):

2.1.1. Round 1

In the first round, a total number of 18 experts responded (90% response rate) (Table 2). The lack of response from the two missing experts was due to their unavailability for this round. Experts were provided a pool of 80 questions, retrieved from the relevant literature [15,29,44–47]. Independent of the other panelists, each member was asked to choose the most relevant questions to measure the study objectives, i.e., factors influencing the overuse of antibiotics in children with URTIs in Saudi Arabia. In this round, experts were given complete freedom in their response and were invited to generate ideas [48]. Experts were also asked to decide on which dimension each question falls within, i.e. knowledge, behaviors, attitudes, and beliefs.

2.1.2. Round 2

The persons who responded to the first round were only included in the second round and so forth in the third round. Fourteen experts out of the 18 responded in the second round (78% response rate). After the analysis of the first round, the included questions, i.e. items that obtained more than half of the experts' agreement [49], were sent back to the experts along with the percentage of agreement for each item. Experts were asked to agree, disagree, and/or comment on the items. Then, the first draft of the questionnaire was complete based on the experts' feedback from this round.

2.1.3. Round 3

The first draft of the questionnaire was then sent to the experts to obtain their final confirmation, where they had three options for each section of