

Expert assessment of an audio and force feedback birthing simulator: a questionnaire based survey

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Introduction

Very little is known regarding the value of birthing simulators in student education, residency and postgraduate obstetric curriculum especially for teaching operative vaginal delivery. The purpose of this paper is to validate the use of a force and audio feedback birthing simulator SIMone™ (3B Scientific GmbH, Hamburg Germany). A questionnaire based survey is performed to ascertain the opinion of obstetricians and gynaecologists on this topical issue. By means of the survey, expert's experience, motivations and possible barriers to simulation based education in obstetrics are taken into account. We present the first results that will provide evidence and that will underline the use of birthing simulators and therefore optimize clinical hands-on training.



Figure 1:
the delivery simulator SIMone™



Figure 3:
vacuum extraction



Figure 4:
forceps delivery



Figure 2:
screen capture showing cardiotocogram, partogram and fetal head's positioning

Results

The questionnaire based assessment involved a total number of participants of n=53, which consisted of n=35 (65%) interns and n=13 (24%) residents in obstetrics/gynaecology (Figure 5). On average during their career, the participants performed 1128,25 assistances with a normal delivery (std.dev.: 3134,71), 240,02 caesarean section (std.dev.: 752,11) and 74,78 vacuum extractions (std.dev.: 167,35). The average number of performed forceps deliveries was comparatively low at 52,75 interventions (std.dev.: 189,62) (Figure 6). Over 2/3 of all participants strongly agreed, that simulators in obstetric training in general were useful. Only two participants disagreed or strongly disagreed (Figure 7). In most cases the general anatomical accuracy was considered as either very accurate or accurate (Figure 8). A very high or high degree of reality of the simulator SIMone™ was reported by 39 participants (83,0%) of our survey (Figure 9). The overall assessment of the quality of the simulator SIMone™ in 93,3% was considered as very good or good. There was no negative statement concerning this item (Figure 10). Finally 96,1% of all participants would recommend the SIMone™ to colleagues (Figure 11).

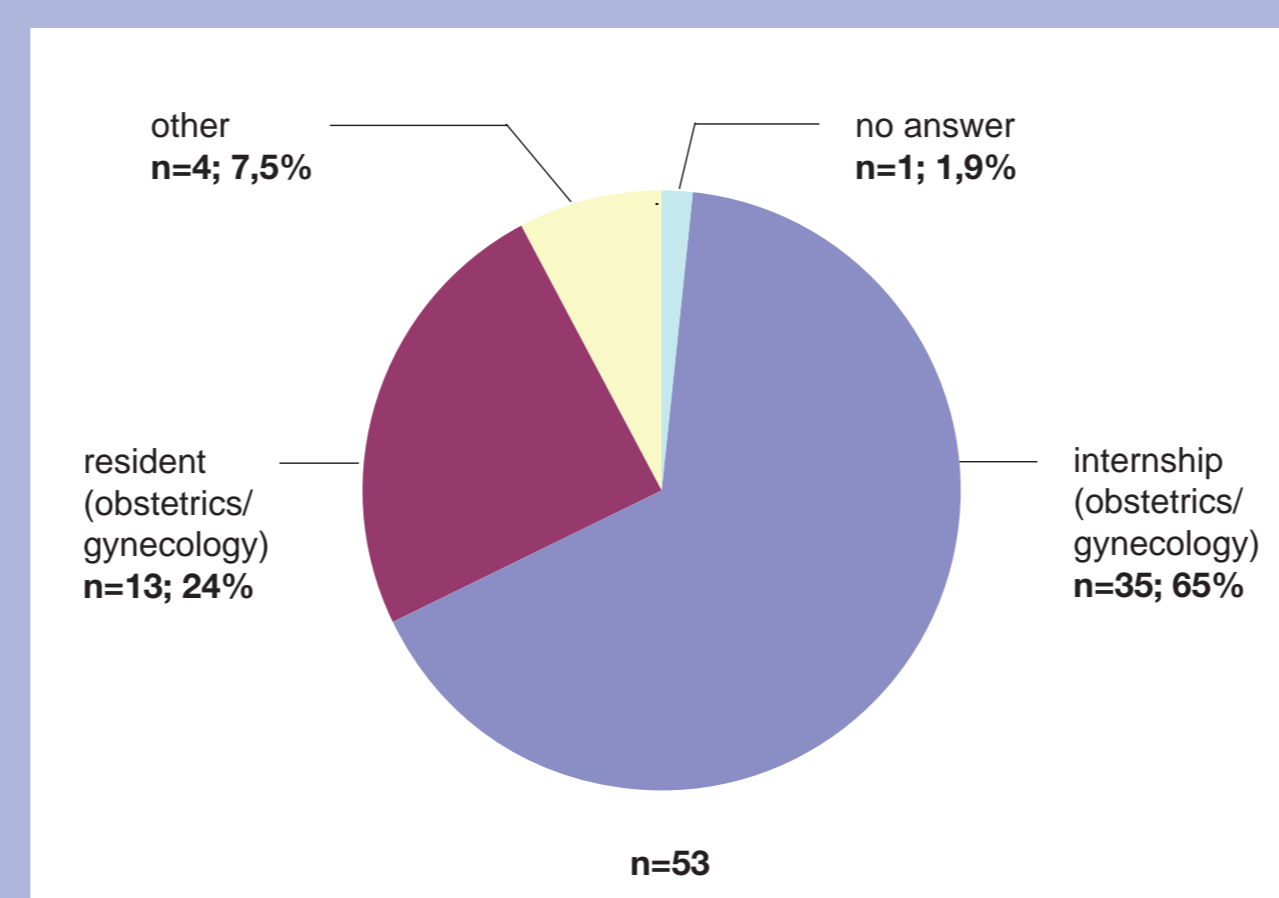


Figure 5:
medical qualification of participants

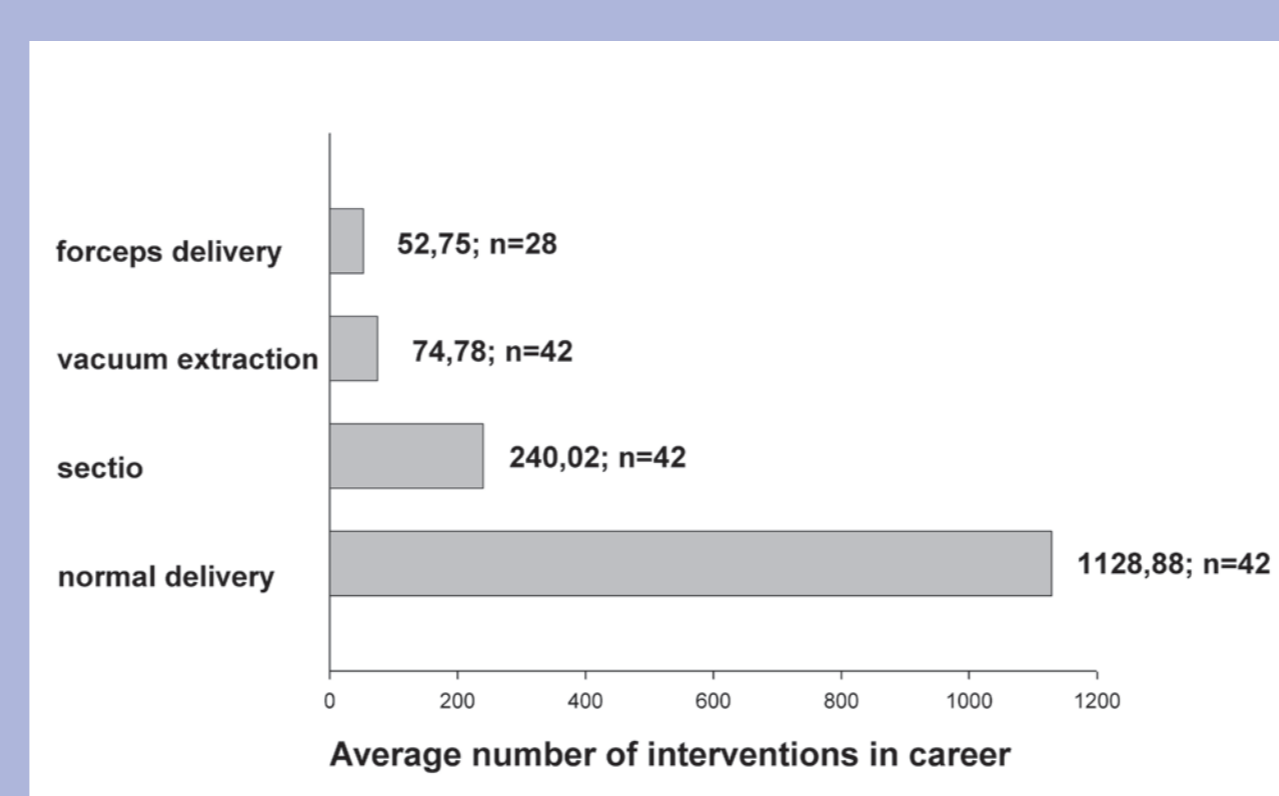


Figure 6:
performed interventions during the career of participants

Methods and Tools

The delivery simulator SIMone™ [1] is a model of a female abdomen with a vulva and the Spinae ischiadicae as landmarks. Inside the model there is a foetal head with a sagittal suture and fontanelle for determining the position and approach of the head (Figure 1). A touchscreen (Figure 2) shows a corresponding image of the fetal head's positioning and rotation within the pelvis. By means of various scenarios different birthing processes can be simulated. CTG, partogram and documentations (results, anamnesis) are presented as well as possible interventions, i.e. vacuum extraction (Figure 3) and forceps extraction (Figure 4). The monitoring software provides information in response to the manipulation of the foetal head in the context of force-feedback. The speed and resistance shown during pulling correspond with a real situation. During the different delivery scenarios, the user of the simulator assesses the course of the delivery and considers all the necessary measures, such as the recognising the correct moment for a forceps delivery. The simulation also supports audio aspects. A loudspeaker emits the foetal heartbeat of the CTG device, as well as the respiratory sounds and experience of pain of the "mother" as a consequence of the delivery and the actions of the person assisting in the delivery respectively. A questionnaire based survey of experiences, perceptions, motivations and perceived attitude to simulation-based education in instrumental delivery was designed and distributed to interns, obstetricians and gynaecologists attending a hands-on workshop (Perinatalsymposium, November 16th - November 18th 2007, Universitätsklinikum für Frauenheilkunde und Geburtshilfe, Medizinische Privatuniversität Salzburg, Austria) and a conference (23rd German Conference of Perinatal Medicine, November 29th - December 1st 2007, ICC Berlin, Germany). Our expert assessment survey uses a 5-point Likert-scale [2] (1, strongly disagree; 3, neutral; 5, strongly agree) for scoring different items. More than other aspects were anatomical and clinical fidelity, i.e. transvaginal examination of fetal head station

were considered as relevant scoring parameters (1, very unrealistic; 3, neutral; 5, very realistic). Statistics were performed using SPSS software version 15 (SPSS, Chicago, IL).

Figure 7:
assessment of the usefulness of the simulator SIMone™

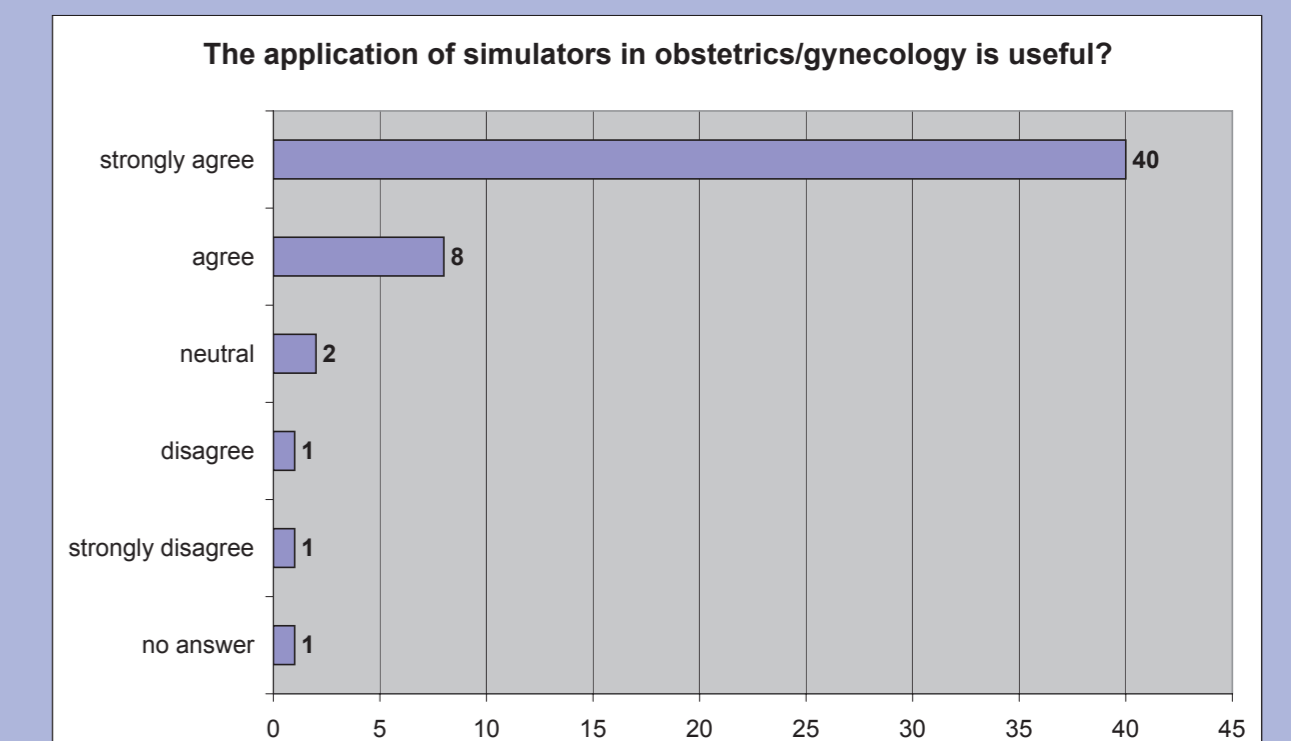


Figure 8:
assessment of accuracy of general anatomy of the simulator SIMone™

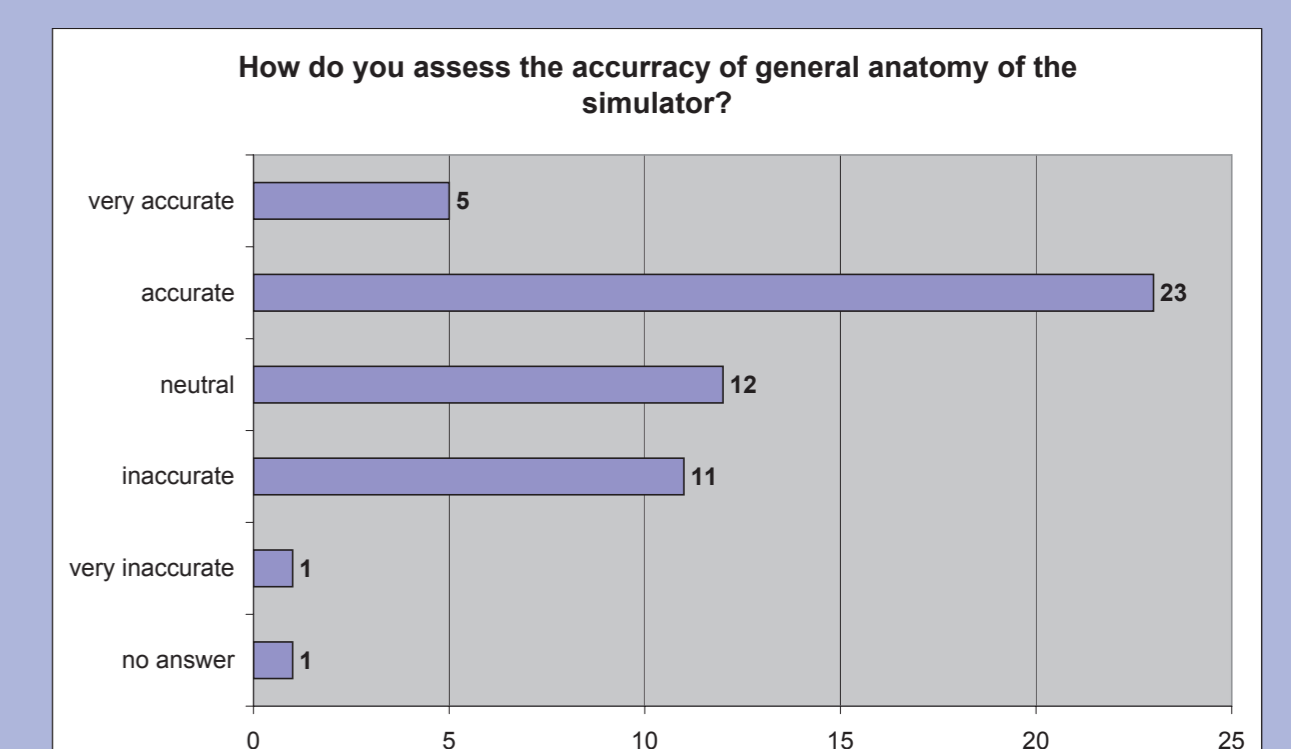


Figure 9:
assessment of degree of reality of the simulator SIMone™

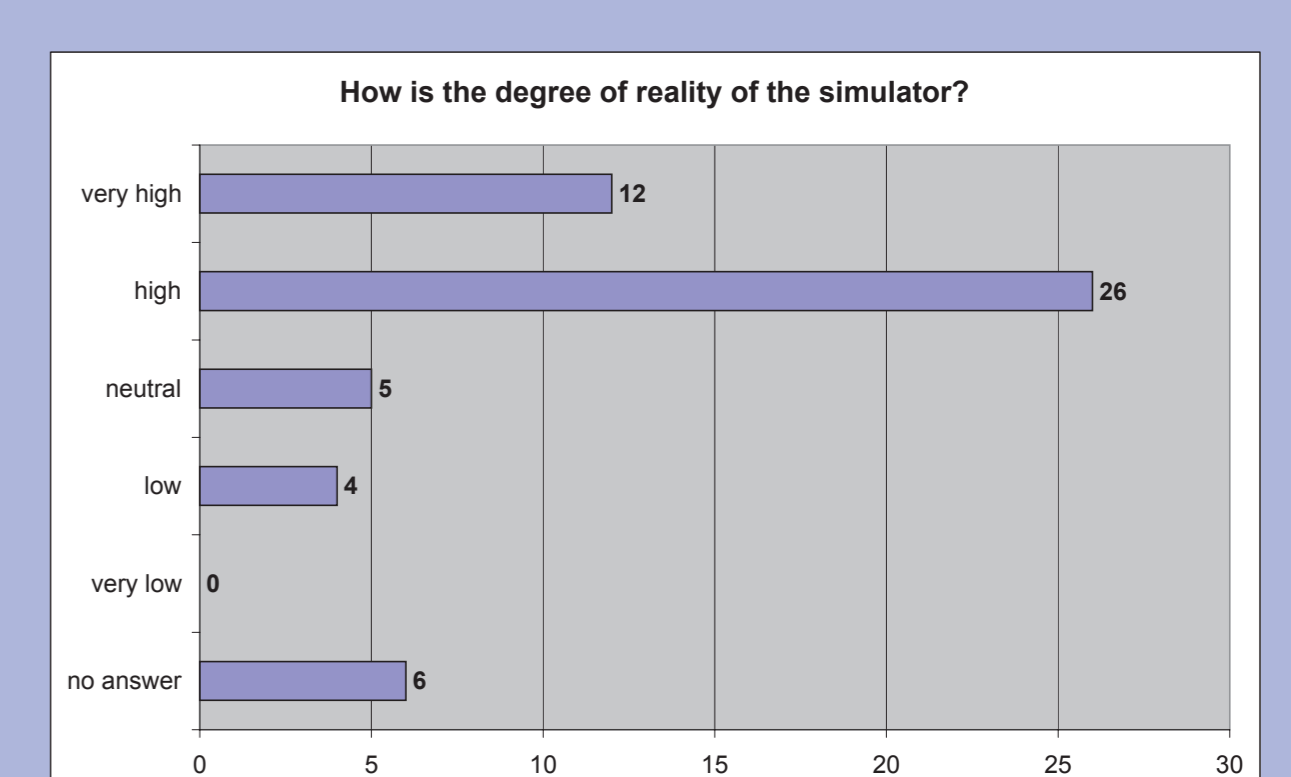


Figure 10:
assessment of general quality of the simulator SIMone™

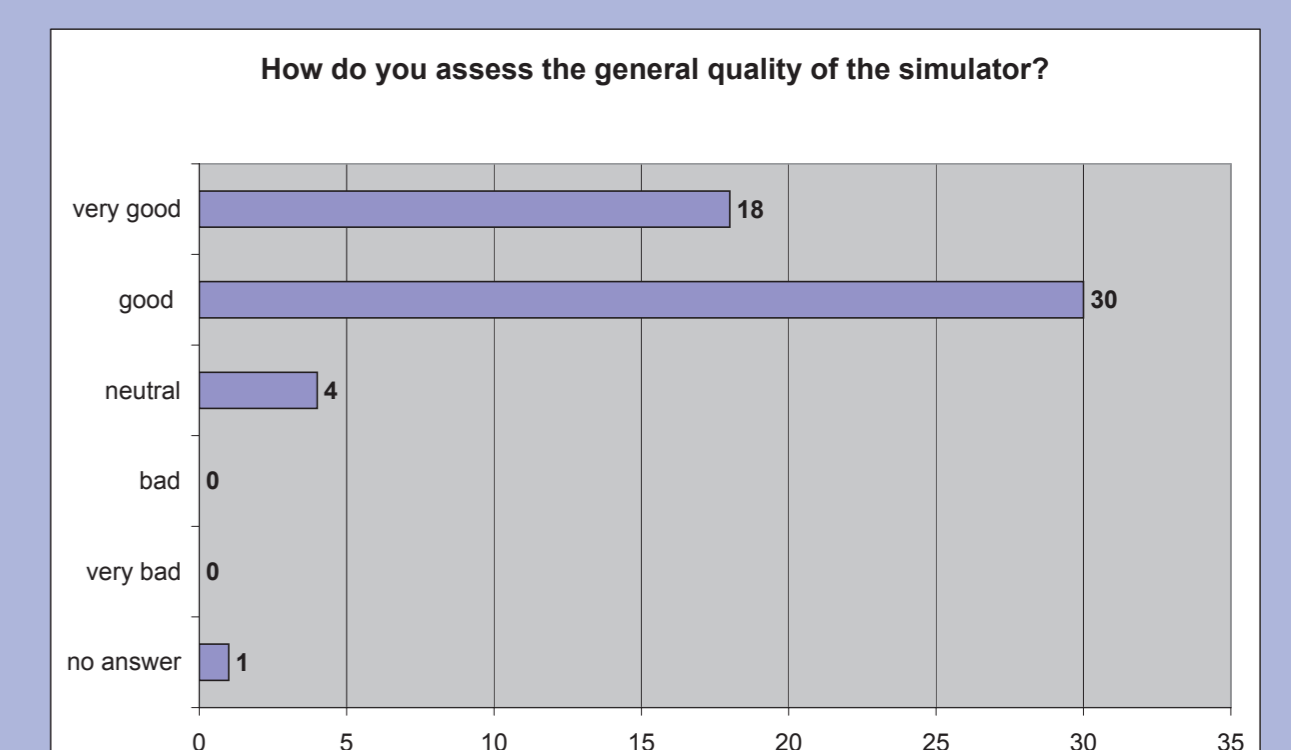
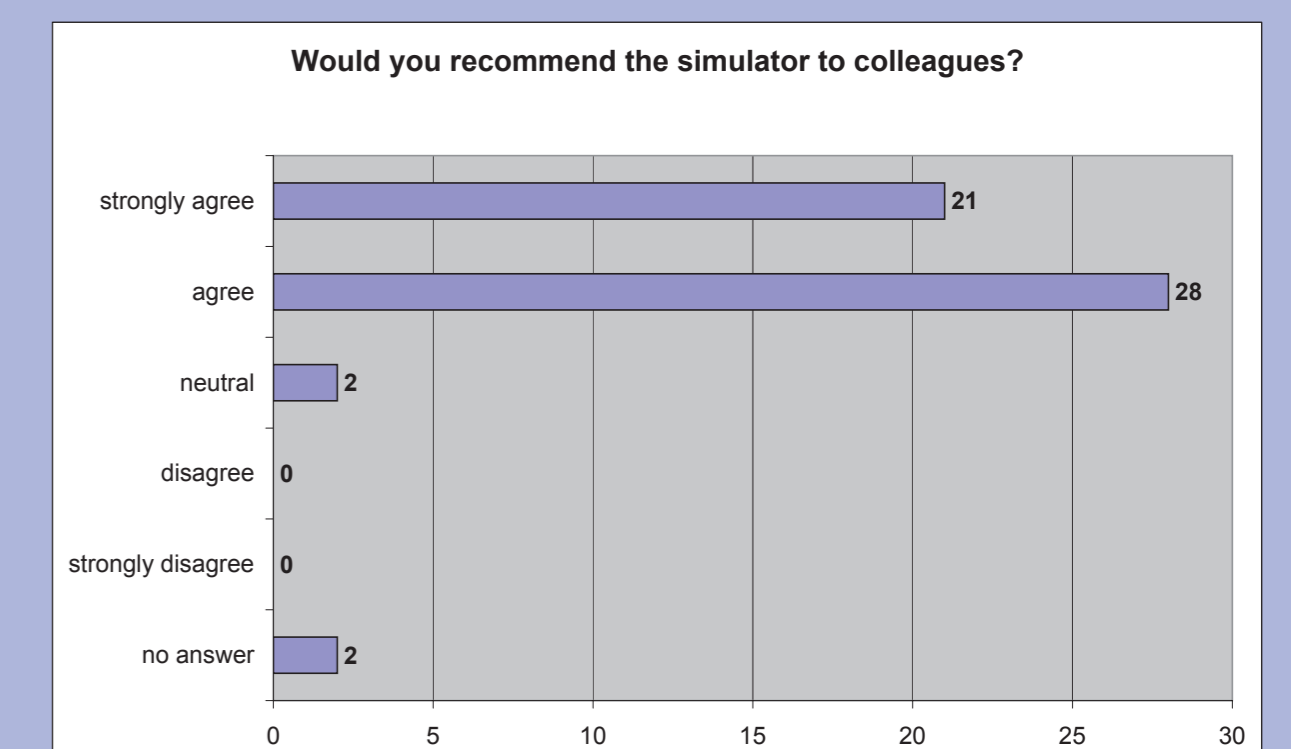


Figure 11:
tendency to recommend the simulator SIMone™ to colleagues



Conclusion

The measurement of opinions is described as reliable and reproducible as other biometric techniques [3]. Our validation study strongly suggests, that simulators in medical education have utility in obstetrics and gynaecology. The results show, that SIMone™ is able to perform realistic and interactive simulations of forceps delivery, vacuum extraction as well as normal delivery.

According to the participants's assessments there is a good accuracy of anatomical conditions. Furthermore the simulator SIMone™ provides an opportunity to simulate birth scenarios and complications so that the trainee can practice more frequently than they would be able to do with seldom real clinical situations

Literature

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- [2] Likert R: Rensis Likert on managing human assets. Bull Train (1978), 3:1-4
- [3] Smith BH, Penny KI, Purves C, et al.: The Chronic Pain grade questionnaire: Validation and reliability in postal research. Pain (1997) 71: 141-7